

ANNALS
OF
OTOLOGY, RHINOLOGY
AND
LARYNGOLOGY.

VOL. VIII. NOVEMBER, 1899. No. 4.

DIABETIC ULCERATIONS OF THE THROAT.*

BY W. FREUDENTHAL, M. D.,

NEW YORK.

Although in a disease like diabetes one might expect to find ulceration in almost any part of the body, it was a great surprise to me in looking for literature on this subject not to be able to find mention of one single case, not even in Seifert's excellent article on ulcerations of the larynx (Heymann's *Handbuch der Laryngologie*, etc). So it seems to me that these cases must be extremely rare.

The first case that came under my treatment was not correctly diagnosticated; first, because the patient did not tell me he was suffering from diabetes; and secondly, because I had never heard of diabetic ulcerations in the throat. As tuberculosis and syphilis could be excluded, I regarded the ulcerations as doubtful. I heard that he was suffering from diabetes only shortly before his death, without, however, attributing any importance to this fact.

When I saw the next case, the family physician told me that the patient was suffering from diabetes, and at once the question entered my mind whether these ulcerations might not be of diabetic origin. As I could not find any other cause for these ulcerations, I had to regard them as diabetic.

*Read before the New York Medical Union November 28, 1899.

Before entering into details I wish to state that it is my impression that there exist two different forms, viz: those of a malignant, and those of a benign character.

a. The *malignant ulcerations of the throat of a diabetic origin*, do not seem to yield to any treatment. Difficulty in swallowing increases constantly, and the patient dies in dreadful pain. It is natural that the exitus letalis is hastened by the lack of nourishment, due to dysphagia.

CASE I.—Mrs. N., 49 years of age; has suffered from diabetes for 9 years. Her throat commenced to trouble her about 6 months ago, when she thought she caught a cold. Soon she noticed pain in swallowing, which has constantly been growing worse. At present it is so bad that she can swallow only with great difficulty. Leaving out the other details of her case which present nothing unusual, I will say that on inspection the pharynx showed the following: There was a broad ulceration commencing on the left side of the uvula, involving this only slightly, but extending for about an inch down towards the pillars. Besides, one could plainly distinguish another smaller ulcer involving the anterior part of the left tonsil and the anterior pillar. Both ulcerations seemed to have originated from infiltrations, and showed somewhat elevated edges with ulcerative deepening at the centre. The whole picture impressed me as tuberculous. But there were absolutely no signs of this disease to be found elsewhere.

The lungs were normal, no bacilli in the sputum, nor were any to be found in the secretions taken *repeatedly* from the ulcerations. Nevertheless, these were curetted by me and treated with the much lauded lactic acid. The result was entirely negative. The patient had such pain after this "operation" that she could not sleep for the two following nights. She went from bad to worse, consulted many physicians and I only saw her twice more, a few days before her death; i. e., about five weeks after her first visit. Another ulcer had developed on the right side, and the first ones had become larger and much deeper. She died of inanition.

CASE II.—Mrs. P. M., 59 years of age; has been married twice. Had a child with the first husband which died at ten months, of pneumonia, and two years later an abortion,

which came on "in consequence of fright." Her physician, Dr. O., knew both husbands and is positive that they never had any specific disease, nor could any such symptoms ever be found on Mrs. M. Dr. O. discovered about two years ago that Mrs. M. was suffering from diabetes, and for three weeks previous to her coming to me, she had been suffering from dysphagia. On inspection one could readily see an extensive ulceration on the left side of the tongue extending over its edges, and corresponding to this, an ulcer on the mucosa of the cheek. The teeth of the patient were in good condition. No tubercle bacilli were in the sputum nor on the ulcers, no glandular swellings, nor any signs of syphilis or tuberculosis. Here, too, I applied lactic acid with no result whatever. A mild gargle and the application of cocaine were about the only measures that gave her any relief. I saw her in consultation every few weeks and could notice that her condition was getting worse, the ulcerations growing deeper and larger, and finally new ones springing up on the epiglottis. She died about five months after I saw her first.

The next cases seem to justify me in classifying them among

b. *The benign ulcerations of diabetic origin.*

CASE III.—On May 7, 1899, I was called, as a last resort, to Mr. Wm. P., a merchant seventy years of age. Dr. Burgheim, the attending physician, told me that since he had known Mr. P., i. e., four years, he had been suffering from diabetes. For about two weeks he had complained of sore throat and dysphagia. He formerly had sore throat occasionally, but it improved rapidly as a rule. Now, however, it was getting worse constantly. When I saw him it was so bad that for three days he had been unable to swallow a morsel of food, not even milk. The patient was a tall, stout man, and so weak that he could not hold his tongue out. On examination, which was extremely difficult as Dr. B. had to hold the patient's tongue and the patient's head shaking constantly (*tremor senilis*), I found the whole larynx, as far as I could see, changed to a mass of ulcerations. There was a deep ugly looking ulcer on the laryngeal surface of the epiglottis, extending down as far as one could see, and the interarytenoid space was also

ulcerated. Besides, there was a good deal of mucus in the larynx and trachea, which the patient was unable to remove. When I remarked that it was necessary to treat him locally, his children thought it cruel to bother a dying man with treatment, but, nevertheless, consented. I at once made my first application of orthoform, a procedure which took me about three-quarters of an hour. I wish to state, right here, that I attribute the most excellent and gratifying result in this case to this thorough treatment, which I continued for about four weeks daily, and to the use of orthoform. I cannot lay too much stress on two points; first, the ulceration must be clear, i. e., free from all débris and mucus so that when orthoform is applied, it is able to reach the nerve ends quickly, and thus be effective; second, the drug must remain on the ulcer until it is absorbed. If a paroxysm of coughing sets in, naturally all the medicine is coughed up again and we have no effect from it. I, therefore, proceed in the following manner:

First, the throat is cleaned out with any indifferent spray. If the patient is as helpless as Mr. P. I generally swab the larynx out so as to get a clear view of the ulcer. Then the larynx is anesthetised thoroughly with cocaine. After this is effected, I inject at intervals, as much of a syringeful of my orthoform emulsion as the patient can bear. Sometimes I commence with a quarter of a syringeful, equal to about ten grains of the solution or even less, and gradually give more. If we inject too much, or at too short an interval, the fluid runs down the trachea and a coughing spell results. I use menthol in the above emulsion from 2% to 10%; formerly I used only 10%, but found that in the beginning it is often too irritating.

My formula now is therefore:

R

Menthol	-	2.0	-	10.0
Ol. amygdal. dulc.	-	-	-	30.0
Vitelli ovi	-	-	about	25.0
Orthoform	-	-	-	12.5
Aqua. dest. q. s. ad.	-	-	-	100.0

Ft. Emulsio.

S. Shake well before using.

This preparation is somewhat weaker than that previously

in use, but it seems to me that nevertheless more orthoform is absorbed than from the other mixtures. I have had the best results with it, and would recommend it highly in this form. Occasionally, however, a very marked burning occurs after the injection of this mixture (I employ an ordinary laryngeal syringe), but this subsides after a few minutes and gives place to a feeling of euphoria.

These last remarks I made* some time ago and I can only repeat them here, in fact the effect of orthoform in this case was the most remarkable I have ever seen.

It was gratifying to me to see last summer that the above emulsion is being used in many clinics abroad, but since several prominent laryngologists abroad apply the emulsion on cotton, like lactic acid, which I do not consider correct at all, I have explained my procedure here more explicitly.

To return to our patient, Mr. P., he came to my office daily from May 7th to June 12th, when I left for Europe. By that time this extremely weak man had grown so strong that he could come to my office all alone, the ulcerations having healed entirely. I saw him again September 14th, when he complained about some "thickness" in the throat. He had felt well all summer until within a week, but even now he could swallow food easily. The laryngeal ulcerations were well cicatrized. In the pharynx there were superficial erosions on both sides of the uvula down to the tonsils. The whole soft palate looked somewhat edematous. All these symptoms disappeared within a few days and Mr. P. feels perfectly well now. He never had any internal medication.

CASE IV.—This case was a physician, and I record it only from memory. The colleague, a strong, healthy man, 39 years of age, had gone through a follicular amygdalitis—not diphtheria—and three days later felt pain in the same place again. I found an outspoken ulceration of the tonsil. It was not examined for tubercle bacilli, as the doctor did not care to have it done, and it disappeared under mild treatment within six or ten days. Two weeks la-

*W. Freudenthal: "The Treatment of Dysphagia and Cough, especially in Tuberculosis." The Philadelphia Med. Jour., March 25, 1899.

ter the doctor was examined for life insurance and to our great surprise was rejected on account of diabetes. This diabetes was of a very mild form, disappeared within half a year not to return since, a period of nine years. He never had any signs of syphilis or tuberculosis, and is perfectly healthy and strong.

CASE V.—Mrs. G. S., of Yonkers, 41 years old, had four children which are all healthy. For the last few years she has had "neuralgia" in the back. Her feet are swollen and she is very nervous. Three days ago her throat became sore and she thought she would suffocate. She feels now as if something were "lying on the left windpipe." I found an irregular ulceration on the left arytenoid cartilage, besides a slight laryngitis and bronchitis. As all these symptoms seemed to me suspicious, I told Mrs. S. to bring her urine next time, when I found outspoken diabetes. The examination of the sputum was negative regarding tubercle bacilli. I have not seen the patient again.

In looking over these cases I think I am justified in drawing the distinction between benign and malignant ulcerations, although I have to admit that without orthoform Case III might also have run a malignant course, for he was surely very near his end when I saw him. Case IV, however was of such a mild nature that I am sure it would have recovered under any treatment.

In a disease like diabetes where we find trophic disturbances of the tissues all over the body, it is not surprising that we should also meet with ulcerations of the throat; yet I was unable to find any report of them whatsoever. They do not seem to have any special form or shape and look on first inspection at times like tuberculous, and again like syphilitic ulcers; nor is there any special place of predilection for them.

While we know that tuberculosis of the lungs is a frequent complication of diabetes, only *Loeri has seen two cases with tuberculous ulceration (infiltration) of the larynx—but no case of pure diabetic ulceration without tuberculosis has been reported.

*E. Loeri: "Veränderungen des Rachens und Kehlkopfes, etc." Stuttgart, 1885.

Dr. †Joal saw pharyngitis sicca frequently connected with diabetes. I see a great many cases of pharyngitis sicca during the year but cannot remember one single instance that a patient had diabetes at the same time. I do not doubt that it occurs among these patients, but surely not oftener than with other people.

†Joal: "De l'angine sèche et sa valeur sémélologique dans la glycosurie et l'albuminurie." Revue mensuelle de Laryngologie, etc. p. 161, 1882.

250

SURGICAL AND PATHOLOGIC FEATURES OF TUBERCULOSIS OF THE ESOPHAGUS WITH REPORTS OF TWO AUTOPSIES WITH TWO PLATES.

BY WILLARD BARTLETT, A. M. M. D.,

ST. LOUIS, MO..

PROFESSOR OF PATHOLOGIC ANATOMY IN THE MARION H. SIMS COLLEGE OF MEDICINE.

The fact that Dr. Hans Schmaus (1) fails to treat tuberculosis of the esophagus in his work on pathologic anatomy may be taken as tacit evidence that he considers it uncommon. Green (2) dismisses the subject of tubercular inflammations of the esophagus with the statement that they "are very rare." In Kaufmann's (3) text-book is found a mere mention of tuberculous ulcers in this situation.

"Tuberculosis of the esophagus," says Stengel (4) "is extremely rare, and most frequently results from extension of tuberculous adenitis of the bronchial glands." He takes no notice of the various lesions which are possible in this connection. Orth (5) makes the statement in his "Diagnostik" that infectious granulomata in the esophagus are rare, though such of syphilitic and tubercular nature have been observed.

In an inaugural dissertation delivered at Munich in 1895 Hasselmann (6) could collect the reports of only 16 cases from the literature of the preceding 16 years. He himself had observed one case of tuberculous ulceration of the esophagus.

Glockner (7) described, in 1896, a case in which the only lesions were in the muscles, all other component structures of this tube being free from such affection. His observation teaches us nothing of a new disease nor of an unknown lesion; it is interesting simply on account of the location of the tubercle.

The above is sufficient to warrant at least two conclu-

sions: (1) that tubercular affections of the esophagus are exceedingly uncommon, (2) that the authors who treat tuberculosis as an entity and dismiss the subject without even a mention of the esophageal lesions, fail to present a comprehensive view of the subject.

These lesions are: 1. The tubercle itself, 2, the ulcer, 3, the fistula, 4, the diffuse round-celled infiltration observed in any or all the structures in the neighborhood of one of the three first mentioned abnormalities.

One or more of the tunicae of the esophagus may become infected with tubercle bacilli in the following ways:

I. The sputum, as mentioned by Prof. Orth (5), is not uncommonly swallowed by those affected by phthisis pulmonalis.

II. Primary tuberculosis of the digestive apparatus is set up as a result of eating or drinking something contaminated with the specific bacterium; Ziegler (8) and other writers refer to milk as the most common vehicle in such cases.

III. As an example of this disease's spread to the esophagus "by continuity of tissue" it is only necessary to quote Orth (5) as authority for its occurrence after a tuberculous ulceration in the pharynx.

IV. A similar affection of this tube might occur as part of a general miliary tuberculosis and be properly speaking, "hemetogenic."

V. I find nowhere a record of this disease in the esophagus being "lymphogenic" in character, still the possibility cannot be denied, for Gray (9) holds that the lymphatic channels from the esophagus communicate with those from the lungs, and the lungs, through the medium of these lymphatics, are commonly infected after tuberculous lymphadenitis in the nodes which Tillaux (10) describes as surrounding the bronchia like rings.

VI. Progress of the disease to the esophagus by "contiguity of tissue" is illustrated by the contents of softened peri-bronchial lymph nodes breaking into the lumen of this viscus.

A description of two specimens which affords multiple illustrations of the sixth etiologic possibility may not be devoid of interest in this connection.

302 SURGICAL AND PATHOLOGIC FEATURES OF TUBERCULOSIS.

I will for the sake of brevity include here only such notes of the two autopsies as are needful to a complete understanding of the cases.

I. The body was that of a large negro of 30 in a state of fairly good nutrition. Enlarged and softened lymphatic nodes in supra-clavicular regions. Slight edema on lower extremities. Floating 9th and 10th ribs on both sides. Total splanchnoptosis. Large amount of sero-purulent fluid in left plural sack, plura thickly covered with a layer of fairly adherent fibrin. Complete atelectasis of lower left lobe. Obliteration of right pleural cavity through fibrous adhesions. Several ounces of sero-fibrinous fluid in pericardial sack, pericardium in great part covered with an eruption of granulamata mostly larger than the size termed miliary.

Lungs inflated but somewhat oedematous, a few healed scars at apex.

The spleen and a supernumerary spleen, of the size of a walnut, thickly studded with cheesy masses varying in size from a buckshot to a cherry. Slight evidences of amyloid degeneration in the cortices.

Liver, kidney and small intestines studded with gray nodules, miliary in size; enlarged cheezy lymph nodes in the region of the porta hepatis and root of mesentery.

. Very few ulcerations in the lower part of the ileum, varying from a split pea to a dime in size.

The esophagus, the object of chief interest in the cases, presented no less than five fistulous openings in its anterior wall, the same possessing lumina varying in size from a goose-quill to a large lead pencil and leading into cavities within as many different peribronchial and posterior mediastinal lymphatic nodes.

In photograph No. 1 is seen the organ from within, the probes marking the location and general course of four of the fistulae just mentioned. Surrounding the five openings referred to and completely covering the middle half of the mucous surface were countless ulcers varying in size from a small split pea to a dime. Their edges were elevated and hard, their bases clean.

Along the margins of the area thus described were a large number of small gray caseous nodules.

Judging from the very apparent age of the different lesions and from the fact that the patient had been rapidly declining for a few months only, I make a diagnosis of chronic lymphatic tuberculosis with tuberculous pleuritis and a secondary general miliary tuberculosis.

The esophagus seems to me to deserve in this case especial mention, (1) because the seat of a rare affection, (2) because of the great amount of esophageal tissue involved, and (3) because it presents all three manifestations, the tubercle, the ulcer and the fistula, this last lesion being responsible for the appearance of the other two, and itself present in such remarkable multiplicity.

II. The body is that of a tall negro of fair bony frame, greatly emaciated, cut muscles of a grayish red color and dry. Between anterior surface of liver and diaphragm are firm fibrous adhesions imbedded in which are caseous masses.

Liver extends one inch below free border of ribs. Serosa covering small intestines dotted here and there with flakes of fibrin and a large number of gray nodules varying in size from a pin head to a No. 4 shot.

On the right side above are five retrosternal lymph nodes, each of them corresponding in size to an almond and all containing caseous material. Lungs do not quite approximate each other, but are not retracted.

Both pleurae are the seats of fibrous and extensive adhesions, firmest over the apices. No abnormal contents on either side. Pericardium presents a few circumscribed fibrous patches; fluid contents slightly increased. Heart presents no abnormalities.

In the posterior mediastinum are many lymph nodes varying in size from a hazelnut to a walnut, the same showing on section caseous patches, those surrounding the bifurcation of the trachea being anthracocised.

The aorta shows a few limited areas in which the intima cells have undergone fatty metamorphosis.

Lungs on section present certain well defined patches of a deep red color and firm consistence, plainly hepatised;

304 SURGICAL AND PATHOLOGIC FEATURES OF TUBERCULOSIS.

also others of a yellow color in which caseation is evident. They are somewhat edematous.

Spleen is firmly adherent to diaphragm and at the hilus are a number of lymph nodes about the size of a hazelnut, the same undergoing retrograde metamorphosis. The capsule is thickened, the organ is somewhat large; its consistence soft, the pulp hyperplastic and scattered through it are a few well defined caseous patches, in size comparable to a split pea. The kidneys present nothing unusual.

Liver is seen from without to be thickly studded with gray nodules of various sizes. From without as on cut section the organ presents a finely granular surface, and in the porta hepatis lie a large number of nodes about the size of hickory nuts, many of them being caseous. Stomach is distended. Mucous membrane is clouded and marked by numerous small hemorrhages and covered by a thick viscid mucous. Small intestine and large intestine are free from microscopic lesions.

The mesentery lymphatic nodes are uniformly large, in size between a buckshot and a hickory nut, and most of them caseous. At the root of the mesentery lies a mass as large as the two fists of a man, consisting of numerous lymph nodes in all stages of caseation and softening, while upon it rests the head of the pancreas which is thus considerably displaced toward the front.

The esophagus which is here represented by photograph No. 2, presents on its anterior wall but one fistulous opening. From this a sinus leads upward and forward to a softened caseous lymph node situated just behind the bifurcation of the trachea. In the picture a probe is seen, one portion of it being within the esophagus, whose wall it pierces to become visible once more between the two halves of the above mentioned node, this latter lying just to the right of the esophageal border. This organ was absolutely free from further lesions, with the exception of four small superficial ulcers in the immediate vicinity of the fistulous opening.

The findings of the autopsy justify, to my mind, the anatomic diagnosis of chronic lymphatic tuberculosis, miliary

tuberculosis of the liver, tuberculosis of the spleen, tuberculous pneumonia, tuberculous peritonitis and secondary ulceration into the esophagus, the result of a tuberculous destructive process in a peribronchial lymphatic node.*

Years ago W. Ziemssen (11) made it known that secondary perforations (those from without) of the esophagus occurred most frequently as a result of tubercular destruction of lymphatic nodes. We have the same authority for the statement that such fistulae are usually single, that two are uncommon, and that more than two are very rarely seen. In consideration of the above, Case No. I, with its five perforations, is even more interesting.

According to v. Ziemssen the tuberculous process does not as a rule extend far out over the mucous membrane, being limited usually to the immediate vicinity of the new opening. In this particular, my two cases illustrate both possibilities. In No. I. a greater portion of the inner aspect of the tube presents unmistakable lesions, while in No. 2. the mucous membrane was found, with the exception of a few small ulcers right at the opening, to be absolutely healthy.

Question might be raised as to whether case No. 1. was not in reality primary (perforation from within outward). No such assumption seems to me tenable, however, when one takes into consideration the very apparent extent and age of the lymphatic derangement, not to mention the fact that neither the pharynx nor stomach is affected, as might reasonably be expected if the primary focus were in the esophagus.

Both autopsies illustrate at least the tendency, mentioned by two of the authors quoted, to involvement of the esophagus in chronic lymphatic tuberculosis. The symptomatology does not however always give a clew to the presence of so grave a complication, as in neither of these cases, observed in a hospital, did clinical manifestations suggest to the attending physician the possibility of an esophageal lesion.

It is then I hope not going too far, in view of the dearth of diagnostic aids at our disposal, to suggest the use of the esophagoscope in every case of pronounced general lymphatic tuberculosis.

306 SURGICAL AND PATHOLOGIC FEATURES OF TUBERCULOSIS.

Most writers say with Tillmanns (12) that we are indebted to Mikulicz for a really useful esophagoscope. The introduction of the electric light in this connection did much, however, to enhance its value, for which v. Hacker (13) must be given credit.

Aside from consideration of the abnormal, one can but regret that this instrument is not better known and more widely used, for v. Hacker (14) after his most extensive investigations warns us that pathologic manifestations cannot be understood until one has become well acquainted with the normal pictures presented in various parts of the esophagoscope.

This contrivance has been put to quite a variety of uses besides the mere examination of the mucous membrane. Kelling (15) mentions it in connection with extraction of foreign bodies, and cauterization both chemical and electric. It is clear, at least, that the removal of foreign bodies would be attended with less maiming, when conducted in full view of the operator. How often, as Kelling (16) suggests, might exploratory laparotomy for stomach diagnosis, be averted by the simple use of the esophagoscope. But the value of the instrument must not be measured by the foregoing alone. Those who have seen at an autopsy the evil effects of "sounding" some diverticula and strictures will agree with me that the old method of doing it in the dark, is open to improvement. In some individuals the use of this aid to diagnosis is attended with considerable difficulty. Kirstein (17) concluded that one-fourth of all individuals lack the anatomic requirements for such treatment.

The ideas of the different investigators vary somewhat as to the correct technique here involved. Kirstein makes use of the esophagoscope without an anesthetic and with the patient in a sitting posture. For v. Hacker (18), the one to be examined must lie on the side and submit first to the application of cocaine, and then to the introduction of the Mikulicz instrument. Einhorn (19) prefers the last named instrument and a sitting posture, but uses no anesthetic. It is claimed by Kelling (20) that many of the difficulties experienced by others have been overcome by his

jointed esophagoscope, which is to be extended after it has been introduced.

The writers have come to no agreement as regards an anesthetic. Ebstein (21), who has gone deeply into the matter, goes to neither extremity but takes the entirely logical position that no general medication should be indulged in, simply cocaineization of the pharynx and entrance of the esophagus.

My conclusions as to the treatment of tuberculosis of the esophagus necessitate a hasty review of the surgery of that organ, embracing as it does many procedures of a nature little short of sensational.

Garre (22) resected in two patients portions of the esophagus together with the whole larynx. His operations were undertaken for the relief of carcinoma; the cut ends of the tube were joined by sutures, and both patients lived. Two cancer cases were treated by Narath (23) with resection of the upper portion of the esophagus. One patient lived one and one-half years and was able to swallow perfectly.

F. de Quervain (24), after describing a case of resection, expresses most clearly his deductions as to further treatment of the organ. The cut ends should be united if possible. When, however, this cannot be done the lower end of the upper segment must be sewn into the skin of the neck that a fistula may result, else the patient must cough up all the secretion that accumulates and at night be constantly exposed to the danger of aspiration pneumonia. The lower segment should at the same time be held up to the surface for the purpose of feeding, but if this be impossible it may be let go, as it soon becomes closed of its own accord, necessitating of course a gastrostomy.

The technique was from the purely theoretic standpoint somewhat enriched by Biondi in 1895. This investigator removed parts of two ribs, split the diaphragm and resected the cardia of dogs, a procedure which has, I may add, never been tried on the human subject.

A gastrostomy on a patient who gradually lost the ability to swallow is reported by Pepper and Edsall (26). The case is chiefly interesting on account of its pathologic as-

pect; for at the autopsy lung and larynx tuberculosis was found with two *cancerous* strictures of the esophagus and around the same, evidences of a tuberculous process.

From the above as well as from many similar reports it becomes apparent that the surgeons have confined their attention almost wholly to that portion of the tube which lies outside the thorax. We are then in a measure prepared for the statement of Levy (27) that, until very recently, 91.5% of all individuals afflicted with deep-seated growths of the esophagus were doomed to die without operative interference. The same author has a novel way of disposing of the lower end of the organ in dogs after resection; he draws it by a string into the stomach and out of the gastrotomy wound, after which he cuts it off at the cardia. This inversion of the tube was found to be impossible on the human cadaver, the longitudinal muscle remaining *in situ*.

The first to recommend the opening of the undiseased posterior mediastinum for the purpose of operating on the esophagus was the Russian surgeon, Ivan I. Nassilov, but the first to carry Nassilov's daring idea into effect on the living was Rhen (28), who twice resected a portion of the organ for cancer. Stayanov (29), who gives us the most minute details of Nassilov's operation, states that up to March of this year the posterior mediastinum had been opened fifteen times with a mortality of 20% only, the same having been undertaken for the relief of the following conditions, tuberculosis of the mediastinum, acute phlegmon, lesions of the vertebra and cancer of the esophagus. Nassilov's idea was to approach the upper part of this tube from the left and the lower part from the right side, while Patarca (30), whose investigations on this subject have been profound, reasons that the organ on account of its relation to the aorta can properly be invaded from the right side only, no matter which portion of its intra-thoracic extent be involved.

No review of the surgery of the esophagus and posterior mediastinum would be complete without mention at least of the two French surgeons, Quénér and Hartmann (31), whose thesis, I regret to write, is not at my disposal.

From the foregoing it is seen that all portions of the es-

ophagus are, under various pathologic conditions, amenable to surgical treatment. It then suggests itself naturally enough, that tuberculous perforation of this tube might, under the guidance of the esophagoscope be made the subject of similar therapeutics. Partial or total resection is made in typhoid and tuberculous perforation of the intestine in an endeavor to prevent peritonitis, so why may not a like procedure be undertaken in primary perforation of the esophagus accompanied by mediastinal abscess. In this case, simple drainage of the mediastinum without suture of the open esophagus, would be comparable to the treatment of chronic appendicitis by mere incision unaccompanied by the removal of the diseased appendix. However, the esophageal lesions in my two cases are of the secondary variety and the conclusions to be drawn therefrom are in consequence of another sort.

No idea of an operation could for a moment be entertained where the organs were so extensively changed as in case No. I. But in No. II the conditions presented are different; only one fistula existed and the remaining mucous membrane of the tube was practically normal. Here it seems to me that excision of the esophageal lesion would be productive of two directly beneficial results.

I. It would prevent a spread of the disease in the lining membrane of the organ. II. It would certainly obviate the possibility of food passing into the fistulous tract and there decomposing, the foundation of a mediastinal abscess.

I do not deny that caseous peribronchial nodes are usually multiple, that a second or a third might possibly break through into the esophagus, that unknown to us the disease may already at the time of operation have been transmitted to other parts of the body, but I should hope by such a procedure to place a barrier in the way of a progressively fatal malady and, at least, to prolong life.

3894 Washington Boulevard.

BIBLIOGRAPHY.

1. Hans, Schmaus.—*Grundriss der Pathologischen Anatomie*, 1898.
2. Green, F. Henry.—*An Introduction to Pathology and Morbid Anatomy*, 1898.

310 SURGICAL AND PATHOLOGIC FEATURES OF TUBERCULOSIS.

3. Kaufmann, Prof. Edward.—Lehrbuch der Speciellen Pathologischen Anatomie, 1896.
4. Stengel, Alfred.—A Text-Book of Pathology, 1898.
5. Orth, Dr. Johannes.—Pathologische-Anatomische Diagnostik, 1894.
6. Hasselmann, H.—Ueber Tuberkulose des Oesophagus. Centralblatt für Allegemeine Pathologie und Pathologische Anatome, 1896. No. 18.
7. Glockner.—Ueber eine neue Form von Oesophagustuberculosis. Prager Med. Wochenschrift, 1896. Nos. 11, 12, 13.
8. Ziegler, Ernst.—Lehrbuch der Allgemeine, Pathologie, 1895.
9. Gray, Henry.—Anatomy Descriptive and Surgical, 1893.
10. Tillaux, P.—Traité d'Anatomie Topographique, 1898.
11. Ziemssen.—Encyclopedia of the Practice of Medicine, Vol. VIII, 1878.
- 12.—Tillmanns—Lehrbuch der Speciellen Chirurgie, 1897.
13. v. Hacker.—Die Oesophagoskopie und ihre Klinische Bedeutung. Beiträge zur Klin. Chirurgie, Bd. XX, Hft. 1.
14. v. Hacker.—Die Oesophagoskopie beim Krebs der Speiseröhre und des Magens. Beiträge zur Klin. Chirurgie, Bd. XX, Hft. 2.
15. Kelling.—Demonstration der Besichtigung der Speiseröhre mit Biegsamen Instrument. Allgemeine Med. Centralzeitung, 1898. No. 65.
16. Kelling.—Endoskopie für Speiseröhre und Magen. Münchener Med. Wochenschrift, 1898. No. 49 and 50.
17. Kirstein.—Über Oesophagoskopie. Berliner. Klin. Wochenschrift, 1898. No. 27.
18. v. Hacker.—Über dei Technik der Oesophagoskopie. Wiener Klin. Wochenschrift, 1896. No. 6 and 7.
19. Einhorn.—Die Besichtigung der Speiseröhre und der Cardia. New Yorker Med. Monatsschrift 1897. No. 12.
20. Kelling.—Endoskopie für Speiseröhre und Magen. Münchener Med. Wochenschrift, 1897, No. 34.
21. Ebstein, L.—Über Oesophagoskopie und ihre therapeutische Verwendbarkeit. Wiener Klinische Wochenschrift, 1898. No. 6 und 7.
22. Garré.—Ueber Larynx und Oesophagusextirpation. Münchener Med. Wochenschrift, 1898. No. 18.
23. Narath.—Beiträge zur Chirurgie des Oesophagus und des Larynx. v. Langenbeck's Archiv, Bd. LV., Hft. 4.
24. De Quervain, F.—Zur Resection des Halsabschnitts der Speiseröhre wegen Carcinoma, v. Langenbeck's Archiv, Bd. LVIII. Hft. 4.
25. Biondi.—X. Congresso della Società Italiana di Chirurgia in Roma.
26. Pepper, W., and Edsall, D. L.—Tuberculous occlusion of the esophagus with partial cancerous infiltration. American Journal of the Med. Sciences, 1897. No. 7.

SURGICAL AND PATHOLOGIC FEATURES OF TUBERCULOSIS. 311

27. Levy, W.—Versuche über die Resection der Speiseröhre. v. Langenbeck's Archiv., Bd. LVI, Hft. 4.
28. Rehn.—Operationen an dem Brustabschnitt der Speiseröhre. v. Langerbeck's Archiv., Bd. LVII, Hft. 4.
29. Stayanov, P. I.—Les interventions Chirurgicales sur le Médiastin postérieur et les organs y contenus. Revue de Chirurgie, 1899. No. 3.
30. Patarea, G.—La Chirurgie intramediastinale postérieure, 1898.
31. Quénu et Hartmann.—Des voies de pénétration chirurgical dans le médiastin postérieur. Bulletins et Mémoires de la Société de Chirurgie de Paris, 1891.

THE EFFECT OF ATMOSPHERIC CHANGES ON THE
HEARING IN CHRONIC CATARRHAL
OTITIS MEDIA.*

SEYMOUR OPPENHEIMER, M. D.,

ATTENDING LARYNGOLOGIST TO BELLEVUE HOSPITAL, OUTDOOR DEPARTMENT; ATTENDING LARYNGOLOGIST TO UNIVERSITY MEDICAL COLLEGE DISPENSARY; SENIOR ASSISTANT TO THE CHAIR OF LARYNGOLOGY, UNIVERSITY MEDICAL COLLEGE.

It appears to be commonly accepted by the laity, and to a certain extent by physicians, that audition, especially when the auditory apparatus is the seat of a morbid process, is unfavorably influenced by atmospheric changes. With the view of ascertaining the detrimental action of barometric and thermal changes upon the already impaired hearing in catarrhal deafness, fifty consecutive cases of chronic sclerosis of the middle ear were studied over a considerable period of time, and the usual tests were used to determine the variations in the hearing under different atmospheric conditions.

The normal ear is practically uninfluenced by changes in the weather, excepting that, depending upon the amount of atmospheric moisture, the transmission of sonorous vibrations from a considerable distance is more or less clearly appreciated. This follows well known physical laws, and when clearly understood enables one better to appreciate the effect of the same atmospheric conditions upon the diseased ear. For the same reason the intimate relationship of the tympanic cavity to the nasopharynx and other portions of the upper respiratory tract must be taken into consideration. The auditory end organ, for it may be so considered, is but a specialized diverticulum of the respiratory areas, and partakes in all respects except

*Read before the New York County Medical Association, March 20, 1899.

in its special function of the histologic characteristics of the former. The mucous membrane of the tympanic cavity is but an extension of that of the nasopharynx and the physical conditions acting upon the mucosa of the latter affect in the same way that of the middle ear. This is not only anatomically demonstrated in health, but becomes especially marked in catarrhal conditions of the mucous membrane of the nose and pharynx, it being an almost constant rule to find diminution of auditory acuity following long-continued catarrh of the nose or throat.

The vast majority of cases of suppuration of the middle ear result from extension of inflammatory nasopharyngeal changes through the continuous mucous membrane of the Eustachian tube and subsequent infection through the same route. It is decidedly uncommon to observe a case of chronic sclerosis of the tympanum without evidences of nasopharyngeal catarrh antedating the aural affection. As a final evidence of the existence of this intimate connection, little can be done toward the improvement or restoration of the impaired hearing until the other portions of the upper respiratory tract are restored to an approximately normal condition. Therefore it becomes necessary for us to regard catarrhal states of the tympanum and catarrh of the nasopharynx as varying manifestations of the same disease, its phenomena varying only by the interference with the functions of the special organ involved, both being subjected to the same atmospheric influences.

As a rule all the conditions favorable to the production of morbid changes of the respiratory and tympanic mucous membrane are dependent upon a lowering of the general vitality, mainly due to the continuous action of unfavorable climatic or hygienic surroundings. This is of such common experience that it is not necessary to cite individual cases, but it was plainly brought out in the cases studied that in those individuals in whom the hearing was most adversely affected is unfavorable weather a lowering of the general health was present at such times. And when one is run down by disease or other causes, such as fatigue, the susceptibility to temperature and barometric changes is greatly enhanced. Unfavorable

314 EFFECT OF ATMOSPHERIC CHANGES ON THE HEARING.

climatic conditions also, especially if their action on the individual is repeated or constant, produce a state of more or less systemic depression, which, in turn, reacting upon the mucous membrane, renders them less able to resist the morbid causes of catarrhal inflammation.

Primarily the changes in the atmospheric tension causes hypolemia of the mucous membranes by chilling of the body surface, when the dermal covering is not sufficiently prepared for the action of cold or excessive humidity. This is true in a general sense of the entire mucous membrane system, and especially that of the respiratory tract, but locally the action of the lowered barometric pressure may be well observed in the nasal chambers, especially in an individual affected with catarrhal rhinitis. Under these conditions marked congestion and swelling, with increased secretion, result, the turbinal cavernous tissue becomes enlarged, and nasal respiration is decidedly diminished. In bright, clear weather, with a normal or rising barometer, capillary congestion does not take place, and there is no obstruction to the passage of air through the nares.

Besides the relation borne by the auditory apparatus to the upper respiratory tract, the tympanic cavity in its relation to the normal or the varied atmospheric pressure, is related indirectly to the various pneumatic spaces of the head. Changes in the normal atmospheric pressure act the same on the cavities containing air (the antrum of Highmore, etc.) as they do on the tympanum, the pressure exerted in these internal cavities being the same as the pressure exerted upon the external surface of the body. Practically, however, the pressure in the other head cavities does not vary, while the air in the tympanum changes to a certain extent with every act of swallowing, this portion of the pneumatic system being but temporarily in direct communication with the outer air. Upon this fact depends the restoration of hearing in certain cases of beginning catarrhal otitis. By the opening of the Eustachian tube the rarefied air in the tympanum is replaced with the normal pressure air. Diminution of the intra-tympanic pressure, even to a limited extent, seriously interferes with the transmission of sound waves.

For the reason that all the cases presented well-marked

EFFECT OF ATMOSPHERIC CHANGES ON THE HEARING. 315

evidences of sclerotic changes of the tympanic tissues, the term chronic sclerotic otitis media is here used as a characteristic designation in preference to the more common one of catarrhal deafness. In all these cases sclerosis and atrophy represent but later stages of a previous cell proliferation, and a complete understanding of pathologic changes occurring in the tympanum is necessary to comprehend the deleterious effect produced on auditory perception by atmospheric influences. The pathogenesis is constantly and slowly progressing from the initial catarrhal inflammation, with its cellular increase, exudation, and overgrowth, to sclerosis and contraction, and ultimately atrophy of the mucous lining. When this late stage is reached the blood supply is much limited, the tissues are firm and contracted, and the Eustachian tube and nasopharynx in the majority of cases partake in the more or less general condition. In the pure atrophic stage atmospheric changes in no way affect the greatly diminished hearing capacity; while in the sclerotic stage, where examination of the tympanic cavity shows patches of beginning or well-marked atrophy alongside of areas of cell proliferation or hyperemia, atmospheric changes invariably impair for the time being the already affected audition.

The degree of hearing impairment is influenced in proportion to the location of hyperplastic tissue situated at or in immediate proximity to the path of the transmission of sound waves. Should sclerotic or atrophic changes exist in practically all portions of the tympanum, except a small area of proliferating connective tissue situated at the point of articulation of the foot plate of the stapes with the oval window, any slight change in the barometric pressure would be immediately appreciated and impairment of hearing rapidly ensue from the additional succulence of this mass of tissue and the resultant interference with the transmission of sonorous vibrations from the ossicular chain to the important structures of the perceptive apparatus. Further, as a result of repeated acute attacks of catarrhal inflammation of the respiratory mucosa, resulting from atmospheric alterations, Eustachian salpingitis is of frequent occurrence, and from the

316 EFFECT OF ATMOSPHERIC CHANGES ON THE HEARING.

consequent occlusion of the Eustachian tube stagnation of the air in the tympanum results: this air, originally of the same pressure as the surrounding atmosphere, is to a great extent absorbed by the blood-vessels and becomes rarefied. The usual pressure is then removed from the capillaries and they become engorged with blood, and exudation of serum takes place, greatly interfering with the hearing. The hearing is also influenced through atmospheric changes in other ways than this; such as the production of an acute syringitis superadded to the already existing chronic process, and occasionally acute inflammation of the tympanic mucosa may result and produce impairment of audition in the same manner.

In all, fifty cases were under observation, and of these there were thirty-one females and nineteen males.

As is well known, females are usually more susceptible to the ill effects of variable weather than males, especially as they are not, as a general rule, exposed as much to the elements as are the latter. Sex, however, bore no relation to the effect of barometric and thermal changes upon the hearing, the proportionate majority of those stating that the hearing was more impaired in damp weather being males. The youngest patient was nine years old, while the eldest was eighty-three. A careful analysis showed that although the hearing ability was less in those of advanced years than in the younger patients, yet all things being equal, the age of the individual was in no way a factor concerning the relation of the atmospheric variations to the impaired hearing.

The duration of time since the individual's attention was first attracted to the impaired hearing varied greatly, and from the insidious nature of this form of otitis many of the patients could not state the time when the impaired audition was first noticed. Of these, there were nineteen patients, and all stated that the aural affection had existed for at least two years, but other than this no definite data as regarded the duration could be obtained. In ten the disease had existed for a year; in eleven, between one and five years; in two, between five and ten years; in three, between ten and fifteen years; in three, between fifteen and twenty years; and in the remaining

two, the affection had existed between twenty and thirty years. The duration of time intervening from the appearance of gradual impairment of hearing to the time when the patients were first seen varied considerably, as usually morbid changes in the tympanum are fairly well advanced before the impairment of hearing is noticed by the patient. A number of the cases bore evidence to this point; one, for instance, as a typical example, stated that the hearing became impaired but one week before he was first seen, but examination showed that the disease had existed for several years, and the impairment of the auditory function had undoubtedly existed for a considerable time, but attention was only directed to it by an attack of coryza caused by a sudden change in the weather.

The duration of the affection per se bore no relation to the increased impairment of hearing under unfavorable atmospheric changes, this point alone depending upon two factors: First, the amount and location of hyperplastic tissue in the tympanic cavity, and, secondly, the condition of the nasopharynx and Eustachian tubes. Of the first factor the location of the hypertrophied tissue has been referred to, and requires no further consideration here; the amount of new tissue or cellular proliferation is also an important factor in determining the influence of atmospheric changes upon audition in the specific case. Of the fifty cases, eleven presented every evidence of a general atrophic condition of the tympanum, and in all these the hearing was greatly impaired both for the aerial and bone conduction; four of these stated that sometime in the past the hearing was worse on rainy or damp days, but not to any marked extent, while in the remainder, atmospheric conditions had no influence at all. At the time the cases were examined, however, all gave evidence that barometric changes were entirely negative.

Twenty-one cases presented at the same time various phases of the pathologic changes incident to the catarrhal otitis, the examination disclosing that the atrophic condition was not as well marked as were the sclerotic and hyperplastic changes. All of these were influenced by thermic and barometric changes, varying in degree of the impairment of audition with the individual case; while in

318 EFFECT OF ATMOSPHERIC CHANGES ON THE HEARING.

the remaining eighteen the hyperplastic condition predominated and the hearing was markedly diminished during long continued spells of damp, rainy weather, or when there were sudden atmospheric changes.

In this affection especially, the three morbid stages mentioned do not always follow each other in sequence; many are sclerotic or atrophic from the commencement, while in others areas of hyperplasia may remain for a number of years and shrinking and absorbing changes not take place till after long periods of time. It will be seen, therefore, that the susceptibility of the affected ear to adverse weather conditions depends to a great extent upon the special pathologic condition present and not upon the duration of time the affection has existed.

Attention was not especially paid to the influence exerted by the upper respiratory tract; but, independent of the aural pathogenesis, it was found that thirty-two of the cases complained of nasal obstruction, especially marked in rainy weather, and when this occurred the hearing was more diminished than when the turbinal swelling did not exist and when the nares were free. Whether one or both ears were affected bore no relation at all. In thirty-nine cases both were involved; in seven, the right only, while in the remaining four the affection was limited to the left side. The degree of hearing may fluctuate from day to day dependent upon the changes in the weather, and frequently, as a result of the catarrhal salpingitis usually present, there is an associated sense of fullness in the ears, referable to the Eustachian obstruction from the barometric changes.

Three factors in the climatic conditions exert to a greater or less extent their influence upon the aural tissues in morbid changes of the tympanum; these are the humidity, barometric pressure, and temperature. Of minor importance are the electric and other phenomena associated to a much less degree with the three prominent factors. The action of barometric pressure and humidity has been considered, while the effect of purely temperature changes is most difficult of explanation, but, so far as can be seen, practically exerts little influence. Generally, however, patients with catarrhal deafness will

state that they are worse in the winter months, and during the heated term of summer the symptom complex, and especially the deafness is much less prominent. In all probability it is not the cold in winter that exerts a more deleterious action upon the ear than the higher temperature of summer, but the explanation seemingly lies in the excessive dampness of the winter months and the consequent tendency to the production of catarrhal changes of the respiratory and aural mucous membranes.

It may be here pointed out that catarrhal affections are most frequent in the transitional periods of autumn, and especially in the spring, during which times sudden alterations of cold, heat, dampness and moisture become unduly exaggerated. The deleterious effects of climatic conditions upon the auditory apparatus depend therefore not to such an extent upon the yearly range of temperature, humidity, and pressure, as upon the suddenness with which these conditions are apt to vary in a given period of time. For this reason catarrhal otitis is the most common in localities where sudden changes occur in varying rapidity.

CONCLUSIONS: 1. The hearing in at least seventy per cent. of cases with chronic catarrhal deafness becomes worse under adverse weather conditions.

2. The degree of impairment of audition, as influenced by atmospheric changes, is determined to a great extent by the location and character of the pathologic process in the tympanic cavity.

3. The morbid alterations most susceptible to barometric variations are those of hyperplasia.

4. In purely atrophic changes in the middle ear weather variations have little or no effect upon the auditory function.

5. Atmospheric influences also impair the hearing by unfavorably affecting catarrhal processes of the upper respiratory tract and Eustachian tube.

6. All things being equal, the impaired audition in chronic catarrhal otitis is diminished more (under unfavorable weather influences) in those whose general health is below par than in those otherwise healthy.

DILATATION OF THE HEART COMPLICATING OB-
STRUCTIVE LESIONS OF THE UPPER
AIR PASSAGES.

JOHN A. THOMPSON, M. D.,

CINCINNATI, O.

It is well known to the profession that the lungs are chronically congested in valvular heart diseases, especially in mitral insufficiency. It is not so well known that the pharynx and turbinate bodies in the nose are also over-filled with venous blood in this disease. So long as compensation is perfect the condition of the heart does not affect any disease in the upper air tract. When compensation fails, the impaired circulation makes the cure of nasal and pharyngeal inflammations impossible. The effect of this venous congestion on the prognosis of diseases in the upper air tract has not been given sufficient attention in the literature of laryngology. There is not, to my knowledge, any suggestion by any medical writer that the contrary proposition may be true, that is, that obstructive disease in the nose or throat may produce a dilatation if not an actual valvular disease of the heart. Some cases I have treated suggest so strongly this teaching that I have concluded to put my observations on record. The great court of last resort in medicine, the general profession, may then decide whether or not the symptoms seen in these cases have been correctly interpreted. The following cases are chosen out of many I have seen because they are typical of different forms of this disorder.

W. J. T., aged 39, a large, robust appearing man, a farmer by occupation, consulted me in October, 1894, in regard to obstructed respiration. Slight hypertrophic rhinitis was found and a large spur in the left nostril growing from the septum nasi. No general examination was made at the time but the spur was removed under cocaine anesthesia. There was temporary heart failure from the cocaine at the time of the operation but the symptoms were not serious

enough to be alarming. An examination of the chest made three days after the operation showed a slight passive congestion of both lungs and a markedly dilated left ventricle with the apex beat to the left of the nipple line. There was a loud mitral regurgitant murmur which was heard by Dr. Oliver as well as myself. The pulse rate when he was sitting quietly in the office was 120. The patient was given tincture of digitalis, ten minimis four times a day, and a spray of menthol and camphor for the nose. He was placed in the care of his home physician until the pulse rate should be normal. He returned to his home one week after the operation. I examined him there one year later and found him with a pulse of 72, the heart contracted to its normal size, no murmur, no cough, no pulmonary congestion and no obstruction of the nose.

J. E. G., aged 23 years, a very tall, slender blonde, consulted me in August, 1898, in regard to an obstruction of the left nostril which interfered with free respiration. He had atrophic rhinitis. The septum nasi was deflected to the left and a large spur was in contact with the outer wall, touching the inferior turbinated body. This growth was removed by the ordinary method. As is usual in cases of atrophic rhinitis, healing was somewhat delayed. After all the obstruction had disappeared, the patient was still somewhat short of breath. Examination showed the apex beat of the heart in the nipple line. The left ventricle was considerably dilated. The pulse rate was 90 per minute. There was no valvular murmur. He was given tincture of digitalis, ten drops after each meal. October 12th the pulse rate was normal and the dyspnea was entirely relieved.

I was asked March 4th of the present year, by Dr. A. R. Walker, to see F. B., aged four years, for the purpose of removing hypertrophied tonsils and adenoids. Having great confidence in the Doctor's diagnostic skill, I went as requested, prepared to operate. The patient was an undersized, poorly developed child. With the exception of his throat trouble he had always been healthy. The family physician had not had occasion to examine the chest. Making the routine examination before deciding what anesthetic to give, the heart was found with the apex beat in

the axillary line. The area of cardiac dullness was greatly increased in every direction. A loud systolic murmur was heard over the apex. The pulse rate was 118 per minute. The operation was postponed and the child given tincture of digitalis, eight drops four times daily. April 8th the pulse had been reduced to 100-108 per minute and was full and strong. The operation was then made under ether anesthesia. The operation and recovery were uneventful. The heart has contracted some but the murmur is still present.

January 7th of the present year I examined Miss J., aged seven years, for Dr. A. D. Birchard. Hypertrophied tonsils and adenoids were diagnosed and their removal advised. The child was nervous and frightened and to this the high pulse rate was attributed both at the first examination and on the day of operation. Two days after the operation it was noticed that the child frequently took long sighing respirations as though she was always short of breath. The mother then told me he had noticed this symptom for several months. An examination of the chest showed the lungs slightly congested and the heart considerably dilated. The apex beat was a half inch to the left of the nipple line. The pulse varied from 120 to 130 per minute. There was no murmur. Convalescence from the operation in this case was interrupted by an eruption of measles on the fifth day after the operation. When the fever from this intercurrent affection had disappeared she was given digitalis. The drug was not administered as long as was desirable. At a recent examination the heart was found to be smaller but has not yet returned to its normal size. There is no dyspnea.

Another phase of the clinical picture presented by patients with obstructed nostrils and dilated heart was shown in the case of Rosa R. She is a tall, thin, anemic girl of 23. She consulted me in November, 1898, complaining that all the symptoms of a hypertrophic rhinitis, for which I had treated her seven years before, had returned. In addition to the nasal symptoms there was marked dyspnea on exertion. The nose did not show on examination the color of hypertrophic rhinitis, but that of venous turgescence. The turbinated bodies did not contract quickly or

completely when cocaine was applied. Examination of the chest showed the lungs congested and the area of cardiac dullness increased. The apex beat was in the nipple line. The pulse rate was 120 per minute. There was no murmur. This was a case where the nasal symptoms were not due to a recurrence of a former disease but to impaired circulation. Local treatment had little effect on the nose until the pulse rate had been reduced by digitalis to 90 per minute. Then the nasal stenosis and accumulation of secretions were relieved.

The knowledge that obstructive lesions of the upper air passages are occasionally complicated by weakening and dilatation of the heart is important to every practitioner of medicine. The family physician can save himself embarrassment and damage to his reputation by a careful examination of the chest before referring such cases for operation. The operator must know the condition of the heart before inducing either general or local anesthesia. Local treatment of a mucous membrane filled with venous blood does little good. Success in the class of cases just described demands a combination of local and general treatment.

SUPPURATIVE ETHMOIDITIS AND ITS TREATMENT.

FRANK S. MILBURY, M. D.,

NEW YORK CITY,

BOROUGH OF BROOKLYN, SURGEON IN THE EAR, NOSE AND THROAT
DEPARTMENT OF THE BEDFORD HOSPITAL, AND ASSISTANT
AT THE NEW YORK EYE AND EAR HOSPITAL.
(EAR DEPARTMENT.)

In diseases of the accessory sinuses of the nose, it is somewhat doubtful, in the opinion of rhinologists and otologists to-day, which is the most frequently involved, the maxillary sinus or the ethmoid; but I think the consensus of opinion will favor the latter, as recent critical research in pathologic conditions of the nose has shown trouble much oftener in this region than was ever suspected.

The condition may be either an acute or chronic catarrhal inflammation. The acute is not of serious import, generally subsiding quickly without much treatment, whereas the chronic form may end in suppurative ethmoiditis which usually occurs in the course of a catarrhal rhinitis in either its acute or chronic form. The radical view taken by Bosworth and Woakes that "the tendency in all cases, and the result in the large majority of instances of a suppurative inflammation of the ethmoid cells is necrosis of bone," and that "all ethmoiditis tends toward and usually develops, sooner or later, into necrosis" is an observation I think not experienced by rhinologists, generally, in their clinical work. When cases due to syphilis, tuberculosis, mercury, phosphorus or trauma are eliminated, it is not often that necrosis or caries is found.

Occasionally, suppuration has been observed in conjunction with facial paralysis, and it is an undecided question whether the suppuration is due to the paralysis

or the paralysis due to the suppuration. Weichselbaum believes in the first, and quotes several cases to prove his theory, whereas Zuckerkandl is inclined to the latter.

Bosworth classifies ethmoiditis into three divisions: (1) Extracellular myxomatous degeneration, the disease being limited to the middle turbinated body; (2) intracellular myxomatous degeneration, in which not only the middle turbinated body, but also the ethmoid cells had undergone myxomatous degeneration; and (3) purulent ethmoiditis, which may or may not be associated with myxomatous degeneration of the ethmoid, but which usually is associated with nasal polypi.

The inflammation may extend to the cells from the nose, the orbit or any of the accessory cavities, or it may occur by a closure of the osteum ethmoidale by pressure of a turgescent or hypertrophied middle turbinated body, deflection of septum, nasal polypi, etc.

There is much difference of opinion as to whether ethmoiditis causes polypi or that polypi produces ethmoiditis. I believe that clinical experience teaches us that in a measure, both opinions are correct.

A severe inflammation is often followed by necrosis. Syphilis, no doubt, is one of the most frequent causes of necrosing ethmoiditis. Any or all parts of the ethmoid may be affected by an inflammatory process, which is bad enough at any stage, but when it reaches the suppurative type, becomes a most difficult affection to treat successfully. This disease may, and often does, extend to the frontal, maxillary and sphenoidal sinuses. Bosworth, in thirteen cases of ethmoidal disease, found antrum implicated in seven—over 50 per cent. Many cases of exophthalmia, narrowing of the field of vision and blindness have been reported, caused from the pressure of empyema of the ethmoidal and sphenoidal sinuses.

I have found suppuration of the ethmoid quite frequent, but necrosis rather rare, excepting that due to syphilis, phosphorus, mercury, etc. If pain is experienced, it may be at the base of the nose, intraorbital at the back of the eye or in the eyeball, or a very general pain over the whole head, but oftener, there is no pain whatever. Mucus will be seen to ooze from under the anterior extremity

of the middle turbinated body, or the turbinated may be greatly distended and blanched in appearance with no flow of pus, as I have seen in several of my cases. Again, it may empty into the orbit and the pus be discharged from the inner canthus of the eye. It is generally attended with some fetor, but not so pronounced as is the case of empyema of the antrum. If only the ethmoid is involved, the fetor is not perceived by the sufferer, owing to the impairment of the sense of smell.

The health is usually much impaired; asthma, hay-fever and other neuroses often exist, also loss of appetite, nausea from the muco-pus secretion passing through the post-nasal space into the stomach. It is sometimes difficult to tell which cavity is the seat of the disease.

As before stated, a simple inflammation generally subsides spontaneously as soon as the acute nasal difficulty passes away, but a suppurative process may be most difficult to conquer, often lasting for months and years; occasionally never responding to the most skillful treatment.

It may happen that the whole intracellular structure is broken down and carried into the nose, thereby giving a good drainage and effecting a rapid and complete cure.

The treatment consists in thoroughly cleansing the nasal cavities with some antiseptic solution, removing all obstructions to free drainage. Among such are found deflected septum, hypertrophies, spurs, polypi, etc. By good care, a few will get well, but by far, the large majority will require surgical interference. This is accomplished by the removal of the anterior portion, or in some cases, the entire middle turbinated. This is quite readily done by the scissors, drill or various nasal cutting forceps, preferably those devised by myself which I have found to work better than any others. If they are used once by rhinologists, I believe will be continued in use until something better is invented. However, their merit or demerit will be demonstrated. After this is done, curetting or drilling with a bar to break up the intracellular structure is necessary in order to give free exit to pus, and access to the parts for proper cleansing. The wholesale removal of the turbinates, as practiced by Woakes, is absolutely

uncalled for, as is proven by most of the leading rhinologists of the world. Recent cases respond rather quickly to treatment, but those of two or more years' standing are extremely obstinate, and I am doubtful if they ever get entirely well, no matter how cautiously handled. This seems to have been the experience of most men.

On referring to my history records, I find that during the last eight years, there have come under my treatment thirty-nine cases of suppurative ethmoiditis, a few of which I now report.

CASE 1. Mrs. J., 43 years of age, consulted me on April 3d, 1895, complaining of severe headaches particularly on left side, and great pressure at root of nose and in left eye. For eight years, has suffered intensely with asthma. An oculist had corrected a high degree of astigmatism, giving her some relief when reading or doing fine work. A surgeon had divided and exsected a portion of the left supraorbital nerve with negative results. She was advised to leave the sea coast and go inland in hope of relief which she did, spending sometime in Colorado, New Mexico, California and Honolulu with no benefit, excepting what resulted from diverting her mind in a measure, from her trouble. Eventually she returned to Brooklyn thoroughly discouraged. Was advised, for the first time, to consult a nose and throat specialist and referred to me by her family physician.

Examination shows great enlargement of the left middle turbinated body pressing on septum and outer wall of nose, which was broadened unilaterally. A small swelling appeared in inner canthus of eye. Some exophthalmia and contraction of the field of vision of recent date. The turbinated had a blanched appearance and was pultaceous to the touch, indicative of a cystic or suppurative condition, although no pus was visible. Otherwise, both nares were about normal. The general health was miserable.

With the cutting forceps, I removed the anterior extremity of the middle turbinated body, resulting in a free exit of fetid pus, curetted with a sharp instrument easily breaking down all possible intracellular structure which was carious; ope ed from the eye into the ethmoid cells;

cleansing thoroughly with 1 to 10,000 bichloride followed by an insufflation of aristol.

Treatment was continued with more or less regularity over one year, but pus formation has not entirely ceased. However, the asthma, headaches and all eye symptoms have absolutely subsided, and the lady is now in robust health.

The cause of this case is obscure, but it was probably a neglected intranasal affection.

CASE 2. Chas. B., 24, referred to me by Dr. Barker, October 9th, 1897, complained of constant occlusion of nose, being compelled to breathe through the mouth both day and night. Is a sufferer from hay fever and asthma, going to the White Mountains every summer to obtain relief. Has had on neck within six months thirty-two boils and one carbuncle of large dimensions. General cachexia, specific history at 18 years of age. Examination shows very large septal spurs right and left, and greatly hypertrophied inferior turbinates on both sides pressing on septum almost wholly filling vestibule. I could not see middle turbinates even under what contraction could be produced by cocaine, which was but slight. Constant oozing of pus into nasopharynx. With saw, I removed spurs and later a portion of each inferior turbinate. In a few days, I was able to make a proper examination of the middle turbinates finding the right much enlarged and pus coming from beneath the anterior portion. Excepting the prophylactic measures necessary, I did nothing else for several weeks to give time for at least a partial recovery from the operations, at which time, pus was discovered flowing into the nose from the maxillary sinus. The question arose whether the ethmoiditis was caused by a backing up of the pus into the ethmoid from the antrum through the ducts, or the reverse.

However, I at once cut into the ethmoid and removed a large quantity of carious bone. The discharge from antrum soon ceased, proving that the antral trouble originated in the ethmoid. The boils promptly disappeared and no more have formed; also no hay fever or asthma has manifested itself. Health excellent, and the patient has gained thirty pounds.

CASE 3. Mr. M., 54 years of age, consulted me on May 10th, 1898, complaining that for about seven years he had suffered severely with neuralgia; the pain starting from inner angle of right eye and extending first over the corresponding side of the head, and eventually over the whole head. If his nose became occluded, the pain was more severe. For many years, a flow of pus came from the right nostril, and the sufferer noticed that the pain was much greater when the pus ceased altogether or nearly so, than when there was free discharge. He had been treated by his family physician by both local applications, internal medication and nasal spray. A resection of the supraorbital nerve had been advised, but had not been carried out.

Rhinoscopic examination disclosed a much enlarged right middle turbinate from around which a purulent secretion was coming. The ethmoid cells were opened by the forceps and curetted, and although filled with pus, no dead bone could be detected. The pain subsided immediately, and in two months' time the cure was apparently complete. In this case, only the anterior cells were involved.

In my thirty-nine cases, the maxillary sinus was implicated in sixteen. Eight were carious. Suppuration of the whole cellular structure in eleven and anterior involvement of twenty-eight.

215 Jefferson Avenue.

PLASMINE SOLUTION AS A RATIONAL CLEANSING AGENT.

BY A. D. MCCONACHIE, M. D.,

BALTIMORE, MD.

ASSISTANT SURGEON TO THE PRESBYTERIAN EYE, EAR AND THROAT CHARITY HOSPITAL.

The necessity for cleansing solutions in the various diseased conditions to which mucous membranes are liable, has been productive of many and varied agents used in their treatment. Again in all wounds surgical or traumatic, septic or nonseptic, a necessity for some cleansing agent has existed, for the purpose of washing away débris or detritus and thus favoring resolution or healing, either by lessening the chances for infection or neutralizing infection already present. Sterile water alone, or water containing in solution various antiseptic agents has been our means hitherto. Yet such solutions are more or less incompatible with the normal vitality and activity of the tissues and cells of the parts affected. True in cases of virulent infection the need for the strong germicidal solutions is apparent, yet even here their use may be and doubtless is detrimental to the reparative powers of the tissues.

To environ the tissues with their normal pabulum should be our aim, hence our solution should be as compatible as possible with the tissues of the body and not laden with agents which while destructive to bacteria are also destructive to normal functioning of the part. With this end in view for the past year I have been using a sterile aqueous solution containing approximately the inorganic constituents of the blood in my treatment of all non-septic conditions of the eye, ear, throat and nose. Even in septic conditions of the same by mechanically washing away infective material I believe to be more conducive to rapid restoration than by using more toxic and hence more incompatible solutions.

In post operative conditions—e. g. after intra-nasal, pharyngeal, ocular or aural operations especially when done on non-infected parts, I know its use to be followed by more rapid and kindly repair. In the virulent infection of gonorrhreal ophthalmia, when the stronger antiseptics are imperative, the urgent need of thorough cleanliness is seen, and here the solution answers well. That it has a more extended use in the post operative washing in general surgical and inflammatory affections I have no hesitation in predicting.

After using it in powder form put up by a local druggist in proper proportion for solution I had Parke, Davis & Co. prepare a tablet which when dissolved in two ounces of sterile water gives the normal inorganic salts in the proportion found in the blood and in solution of about the specific gravity of blood, but of course devoid of its albuminous constituents.

Each tablet (called Plasmine) contains

Sodium Chloride.....	5 1/2 grs.
Sodium Carbonate.....	1 1/2 grs.
Sodium Phosphate.....	1/4 gr.
Sodium Sulphate.....	1 1/2 grs.
Potassium Chloride.....	1/4 gr.
Potassium Phosphate.....	1/12 gr.
Potassium Sulphate.....	1/4 gr.

I am satisfied that a trial of this solution will prove itself satisfactory both to the patient and the doctor in those irritative ocular and nasal conditions whether chemical, mechanic or operative requiring a lotion to wash away irritant material and thus favoring a rapid restoration to the normal.

That it is better tolerated than normal salt solution or sterilized water, borax drops, boric acid drops, etc., I feel convinced from the patient's statements. That it rapidly lessens infection I have proven by noting the lessened multiplication of various bacilli and cocci found in the various catarrhal conditions of the mucous membranes of the eye, nose and throat.

I trust others will give it a trial and report their experiences.

805 N. Charles St.

PERSONAL OBSERVATIONS IN THERAPY.—VAL-SALVA'S METHOD REVERSED.—MUCO-CUTANEOUS LESIONS.—HEMOSTATIC FOR MUCOUS SURFACE OPERATIONS.—A SPLINT FOR SEPTAL OPERATIONS.

BY A. T. MITCHELL, M. D.,

VICKSBURG, MISS.

OPHTHALMOLOGIST TO THE STATE CHARITY HOSPITAL.

This article is published in the hope that to some readers at least sufficient novelty may be found to justify publication, and the assurance is made that in the writer's modest facilities for practice the measures enumerated have at least done no apparent harm.

VALSALVA'S METHOD REVERSED.

A consideration of the pressure exerted on the membrana tympani by this effort at expiration with outlets closed, involves only the simple calculation of the individual's vital respiratory capacity and his capacity for forced expiration as indicated by some form of spirometer. With the first factor determined by individual measurement, and the second by spirometric registry, the normal atmospheric weight gives the third.

Nothing is quite so familiar to us as this way of forcing air to the tympanum by using the expiratory muscles' utmost effort to reduce the volume of the air in a previously expanded chest.

The result in forcing out the drum membrane can be as above shown accurately expressed in definite values.

Allowing for the difference in inspiratory and expiratory efforts in individual sets of muscles, I venture the claim that the same factors will figure in the estimation of the force exerted in the following manoeuvre for decreasing instead of increasing intra-tympanic atmospheric pressure.

If with the tragus pressed in the external auditory meatus as far as possible after forced expiratory effort, the anterior nares closed and the greatest possible inspiratory effort made, it stands to reason that there must be a decrease of pressure in the upper respiratory tract.

Granting that the space occupied by the air of an ordi-

nary inspiration at the average in America, as being 24 cu. in., and that taken in by an extraordinary inspiration 100 cu. in., we add 124 cu. in. to the 100 cu. in. of air residing in the lungs after the forced expiration.

The atmospheric pressure being taken as 30 inches of mercury if we disregard the pressure of air in the external auditory canal, that is above normal when the tragus is forced in, we have the subjoined ratio.

$224:100 = X:30$, and $X=67.2$ inches of pressure, an increase on the drum area of twice the normal at least.

When, after forced expiration, we close the mouth and nose, and inspire, decrease in the density and pressure of the gases concerned are FIRST felt in the nose and naso-pharynx, because the volume of the confined air is increased FIRST in the lowest lung space by the descent of the diaphragm on the ascent of the elevators of the ribs. Such being the case, a comparative vacuum is made in the Eustachian tube and middle ear.

This condition would naturally draw everything downward, and in the event of fluid in those regions its movement towards aerial equilibrium is inevitable.

That this may be applied with benefit to exudates in the middle ear, is as I regard it, comparable to the question of deciding on the advisability of forcing air into the tympanum by catheter, bag or auto-inflation when desirable; or evacuating fluid by incision, or by auto-suction as I call this little procedure.

In my own experience, I have never seen the fluid line plainly marked on the membrane without making a free outlet.

In many, and the great majority of cases, when I was reasonably apprehensive of fluid mucus in that cavity, I have used this method tentatively with certainly no harm to the case, and yet with the feeling that in the absence of definite reasons for paracentesis, I had an anchor to windward.

MUCO-CUTANEOUS LESIONS.

In the treatment of all conditions of mucous surfaces one great condition for the repair of tissue cannot be fulfilled. This is asepsis, and in the futility of our meagre efforts in that direction, we every day see our wounds heal while bathed with nasal and oral fluids alive with pathogenic bacteria, and know that this rapidity of repair is because of the great blood supply. After using our best efforts to remove as many bacteria as possible from the spot in question, we have not the advantage of the general surgeon in being able to put an antiseptic compress on with a bandage over our operation wound.

That we may, in a measure, prevent excessive infection in our broken mucous surfaces, is, I believe, best done with the application of some *protective* covering. The principle that I wish to point out in the recommendation of the compound tincture of benzoin is the property of all gums to be precipitated from an alcoholic solution by the presence of water.

In splits of the nasal vestibule, abrasions, incisions for small abscesses of vibrissae follicles, for lesions of the labia, the stump of a shortened uvula, and for many other purposes where a tenacious, invisible coating is needed that is in itself antiseptic, it is effective.

I use it constantly as an application after every operation in the nose involving loss of blood as a hemostatic, and in the final stages of ulcers of the cornea, when the base of the ulcer is clear, I use it as a protective in lieu of the bandaged lids.

A small pledget of cotton on an applicator dipped in it will leave on any moist surface a precipitate of gum benzoin.

As a saturation for the ordinary gauzes, it is possibly more desirable than any, where the requirement is not so much drainage as the establishment of a permanent opening.

A HEMOSTATIC FOR MUCOUS SURFACE OPERATIONS.

The suprarenals of sheep desiccated as by Armour & Co. in a saturated extract in a saturated solution of boric acid will permit of an inferior turbinate being sawed off with no more loss of blood than two pledges of cotton on tooth picks will remove.

A SPLINT FOR SEPTAL OPERATIONS.

Instead of fixed sizes and shapes of hard rubber splints, I have used in three late operations requiring the fracture of the septum, splints made of rolls of the common adhesive plaster doubled so that the adhesive sides are in contact with the mucous surfaces, and also holding the folds of the splint together. Small holes can be cut into it, and its cavity made to support the walts by stuffing cotton wet with an antiseptic solution into it. In dressing after the operation, it is only necessary to remove the cotton from its center, irrigate, and replace the antiseptic cotton freshly. It is clean, simple and so far successful that I shall continue to employ it.

ABSTRACTS FROM CURRENT OTOLOGICAL, RHINO-
LOGICAL AND LARYNGOLOGICAL
LITERATURE.

I.—EAR.

Otitis Media and Earache in Lobar Pneumonia of Children.

MELTZER, J. S. (*Phila. Med. Jour.*, Aug. 5, 1899.) The author has observed a sufficient number of cases of lobar pneumonia in children at the beginning of which earache was a first and predominant symptom to make him think there is some causal relation between the two. He reports a number of cases as evidence of this, but in none of them did the earache terminate in suppuration. He thinks the pneumococcus may be the cause as it has been found in the discharges from suppurative ears or that possibly the earache is only a sympathetic pain of the chronically inflamed drum, since the initial earache nearly always occurred in ears which at some time or other had been the seat of an inflammation. *Richards.*

Conveyance of Infection Through the Medium of the Ear Syringe.

TODD, F. C. (*Journ. Amer. Med. Assn.*, Oct. 14, 1899.) Finding the ear syringes in common use to contain many bacteria after they had been in use for awhile and being unable to boil them on account of the leather packing, the author now uses a fountain syringe with a separate glass tip for each patient and also a bulb syringe with a valve at each end and terminating in a removable point. (If the point is all that is at fault, the common, large, metallic, piston syringe can still be used since its point is removable and can be boiled as readily as any instrument.—Reviewer.) *Richards.*

Treatment of Suppuration of the Middle Ear With'Acetanilid.

LIBBEY, GEO. F. (*Med. News*, Oct., 1899.) A number of cases of suppuration of the middle ear are reported in which satisfactory and fairly rapid results were obtained by the use of finely powdered acetanilid as a topical application to the diseased middle ear. The ear is first cleansed with cotton on an applicator; this is followed by the use of peroxide and the ear and canal then wiped perfectly dry. Finely powdered acetanilid is now insufflated into the middle ear in as close contact to the suppurative membrane as it is possible to get it. The process is repeated daily. In the author's cases the time required to effect a cure varied from a few days to several weeks. Where it was possible to keep track of the cases the proportion of recurrences was found to be small. *Richards.*

Infective Sinus Thrombosis, Its Symptomatology and Diagnosis.

WHITING, FRED. (*Journ. Amer. Med. Assn.*, Oct. 28, 1899.) The principal question considered is that of symptomatology and diagnosis and their determining factors.

As regards the technique of operation there are two considerations of paramount importance, viz., the control of hemorrhage and proportional reduction of shock and rapidity in the performance of the needful operative measures. No precaution can be too elaborate and no attention to detail too great in the matter of lessening the loss of blood. At the best it is frequently considerable and when this occurs no time should be lost in the performance of intravenous infusion of normal saline solution at a high temperature and in sufficient amount. Where toward the end of operation the heart action becomes labored and failure imminent, the intravenous infusion speedily allays the condition, the flagging energies of the heart are augmented and with the assistance of hypodermic stimulation thenceforth sustained. The operator should sacrifice every detail save cleanliness and thoroughness to the demands of time, a few moments more or less being important elements in a favorable or unfavorable termination.

Clinically the course of sinus thrombosis may be divided into three stages with local and systemic manifestations; the anatomic appearances of the sinus wall, the pathologic

changes in the clot and the signs of circulatory obstruction may be denominated as local factors; while rapid and excessive fluctuations of temperature, frequently repeated rigors, peripheral or central metastases, embrace the essential systemic symptoms.

First Stage—Presence of a thrombosis, parietal or complete, not having undergone disintegration and accompanied by slight or moderate pyrexia, rigors being usually insignificant or absent.

Second Stage—Presence of a thrombus, parietal or complete, which has undergone disintegration with resulting systemic absorption, characterized by frequent rigors and pronounced septicopyemic fluctuations of temperature.

Third Stage—The thrombus has undergone disintegration with systemic absorption, rigors, rapid and great fluctuations of temperature, and central or peripheral embolic metastases, terminating usually in septic pneumonia, enteritis, or meningitis. The diagnosis in the first stage is seldom made preliminary to the operation for mastoiditis; its detection follows as a rule the recognition by the operator of extension of the carious disease through the inner table along the course of the sigmoid groove or at some point in the vicinity. Granulations from an eroded dura may be already protruding into the pneumatic spaces of the mastoid, the removal of which carries the operator to the parietal wall of the sigmoid sinus and to the uncovering of the same, and the finding of a thrombus. Recovery is here possible, though improbable, without operation on the sinus. If it take place it is by obliteration of the sinus lumen. Such a termination is not to be expected. The only safeguard against encountering the increased gravity of the second stage is to operate at once on recognition and the prognosis in skillful hands and in the absence of unfavorable complications is exceedingly favorable.

The interval between the first and second stage is brief and usually heralded by a sharp rigor. The symptoms of this stage (already given) are quite irreconcilable when associated with suppurative inflammation of the ear, with any ailment other than infective inflammation of the sinus. The general symptoms of this stage are those of septicopyemia and the manifestations are the results of the dissemination through the blood and lymph channels of pa-

thogenic micro-organisms liberated for distribution by disintegration of the thrombus. In this stage the features of the patient assume a distressed and anxious look; the countenance is frequently suffused with copious colligative perspiration; loss of appetite and constipation; respiration shallow and frequent, fluctuations in the temperature rapid and excessive, with repeated severe rigors. While the diagnosis is frequently difficult and the symptoms irregular there are certain pretty constant determining factors. These are rigors, which may be expected in four-fifths of the cases, though occasionally wanting. The cases in which the rigor was not repeated are few and the severity of the conditions in proportion. The persistent profuse sweating in the severe cases is one of the most distressing symptoms, weakening the individual and hastening prostration. These may keep up in fatal cases to a few hours before death. The fluctuations of temperature are significant. The marked pyrexia is subject to frequent remissions; at times the febrile period will be extremely brief, a space of two hours sufficing for a temperature range of 6° F. This high temperature is a valuable guide and warning to the septic complications to be expected. Of 95 cases of metastatic sinus thrombosis recorded by Hessler, but 12 exhibited temperatures of 106° F., and of 26 cases which were free from metatases, not one approached this degree. The pulse and respiration are at first moderately accelerated, until with advancing toxemia the pulse becomes feeble and reaches 180 or becomes too feeble to count; the breathing is similarly embarrassed reaching as high as 50 per minute. Vertigo and vomiting are present in some uncomplicated cases, but are more frequent when meningitis is present as a complication. Consciousness is a variable symptom, frequently remaining unimpaired till death; again there may be speedy loss of it associated with mild delirium. A mild form of delirium does not necessarily imply greatly increased gravity in the case, and may be due to a minute non-infective cerebral embolus, but if prolonged with occasional periods of violence the prognosis is distinctly bad, for coma supervenes, and speedy dissolution ensues.

Simultaneous with these manifestations appear what may be denominated local signs of circulatory embarrass-

ment or obstruction. These symptoms are hemicrania varying in severity, radiating from the ear over the corresponding side of the head. Tenderness in the upper portion of the posterior cervical triangle, dependent upon phlebitis of the deep veins of the neck has been a pretty constant symptom. The so-called Griesinger's symptom is an edema of the occipital region extending downward and implicating the nape of the neck, due to phlebitis and obstruction of the mastoid and occipital veins. Gerhardt's symptom is elicited by laying the finger, with sufficient force, across the course of the external jugular of the affected side, to cause obstructive pressure, when it will be noted that the vessel exhibits but slight turgescence or none at all, while on the healthy side the external jugular becomes pronouncedly engorged on the application of pressure. Moderate edema of the eyelids has been observed, but is not constant. Neuroretinitis is present in about fifty per cent. of cases. Tenderness along the course of the internal jugular in the neck manifests itself in the late second or beginning third stage. In the third stage all symptoms are augmented with the additional ones due to the direct result of the dissemination of septic emboli. Here the hopes of successfully combating the disease rapidly diminish though so remarkable have been some of the cures that all hope should not be abandoned until the patient is in extremis. The disintegrated embolic masses are swept along with the blood stream until they meet an obstruction and there begin their infective inflammation. Should this stage be protracted a series of abscesses situated over the whole body may appear. These masses find their way into the general circulation through the medium of the jugular vein, hence the necessity for ligating this vein. Even when this fails to realize its full purpose it in no wise discredits the operative procedure. Metastatic abscesses of the abdominal viscera occur with less frequency than in other parts, as the bronchi and lungs, these being affected one and one-half times oftener than the combined other structures of the body. When possible evacuate the metastatic abscess and drain, allowing healing by granulation. Death in this stage occurs from pulmonary and pleural involvement, meningitis, abscess of the brain and general sepsis. Published statistics

show that numerically by far the greater proportion of cases of sinus thrombosis are operated upon late in the second stage of the affection, and it may be expected that except in rare cases the first stage will escape detection. The earlier the diagnosis can be made the lower will be the mortality, hence the necessity for a more thorough study of the symptomatology.

Richards.

Ossification of the Auricle and the Roentgen Rays.

WASSMUND. (*Deut. Medicin. Wochensch.*, July 6, 1899.) Since Bochdalek's report of "A Physiologic Ossification of the Auricle" in 1866, only few similar cases have been mentioned in medical literature. These cases are those of Voltenini in 1868, Zudder in 1870, Schwabach in 1885, Lin-smayea in 1889 and Knapp in 1892.

The histologic researches of Bochdalek and Knapp showed theirs to be genuine cases of transformation of cartilaginous into bony tissue. The rest of the above mentioned cases were diagnosed simply by the physical appearance of the auricle. The author has by the means of the X ray convinced himself of the genuineness of his case of ossification of the auricle, in a man 49 years of age.

Oppenheimer.

A Foreign Body in the Middle Ear for Two Years.

HAIKE, H. (*Deut. Medicin. Woch.*, Berlin, July 6, 1869.) A girl, ten years of age, who had two attacks of diphtheria in 1896 without any aural complication after a third attack of diphtheria in 1897, oozing of pus from the left ear was noticed which continued with some remissions until the present time. This condition was presumed to be a sequela of the several attacks of diphtheria. A careful examination of the ear, however, revealed a dark foreign body wedged in the middle ear, which could not be removed in toto. Small pieces were detached and submitted to examination. They proved to be pieces of cinnamon. The author concludes that the original foreign body was, no doubt, a small piece of cinnamon which entered the ear unnoticed, without causing any injury or even inconvenience to the patient. By a co-existing chronic otitis media the pus distended the small piece of cinnamon during the course of two years to such dimensions that it filled up the whole of the middle ear and caused dizziness and headache.

to such a degree that the parents brought the child to the Charity Hospital under the observation of the author.

Oppenheimer.

II.—NOSE AND NASO-PHARYNX.

Primary Sarcoma of the Nose.

HARRIS, THOS. J. (*Phila. Med. Journal*, June, 1899.) The author reports five cases of his own in detail and briefly fifty-seven cases, reports of which have appeared in current literature since Bosworth's report in his Diseases of the Nose and Throat of 1889. Dr. Harris' conclusions are:

- “1. The cause of sarcoma of the nose is in no wise determined.
2. Degeneration of nasal polypi is strongly probable.
3. Sarcoma may occur at any age, but is most liable to occur between forty and fifty.
4. All forms of sarcoma are found in the nose, the round cell and spindle cell appearing with about equal frequency.
5. Sarcoma can spring from any portion of the nose, but the cartilaginous septum is the most common site.
6. Sarcoma develops insidiously, but obstruction to breathing and epistaxis are the chief symptoms.
7. Sarcoma is seen most frequently as a pinkish red tumor, rather soft, provided with a pedicle.
8. The prognosis is bad; over one-half die.
9. The round cell variety is the most fatal form.
10. Operation is indicated at the earliest moment.”

**Richards.*

Anatomic Variations of the Nasal Chamber and Associated Parts.

CRYER, M. H. (*Journ. Amer. Med. Assn.*, October 14, 1899.) It is absolutely impossible to do this paper, with its thirty-one illustrations any justice within the limits of an abstract. Touching as it does a field of great importance to every worker in the nose the reviewer would urge every reader of this journal to read the whole of Dr. Cryer's paper.

Richards.

Nasal Catarrh; Its Surgical Treatment.

SUMNER, ARTHUR F. (*Jour. of Medicine and Science*, Sept. 1899.) A review of the physiology of nasal breathing and the symptoms which follow nasal obstruction accompanied by diagrams illustrating some of the more common causes of obstruction in the middle and anterior nares.

Richards.

Chronic Empyema of the Accessory Nasal Cavities With Report of 7 Cases.

STOUT, GEO. C. (*Phil. Med. Journal*, Aug. 26, 1899.) These cases were largely frontal combined with antral empyemas and illustrate the frequent coincidence of the two. A review of the various theories as to causation of these empyemas is given and the opinion expressed that most cases of empyema of the accessory cavities are caused by hypertrophic conditions of the nasal mucous membrane which close up the infundibulum, osteum maxillaire, and other openings. The author regards chronic antral inflammation as frequently coincident with trouble in the frontal sinus and says this should be carefully looked for before operating on the antrum. This fact is attested, on the post mortem table, by the frequent absence of any etiologic factor in the antrum, and by the action of gravity which would naturally cause pus from the frontal sinus to make its way into the antrum. The researches of Cryer and others have shown that these are frequently freely connected. A brief review of the various methods of operation are given. Paracentesis for frontal sinusitis is discussed somewhat fully and recommended in appropriate cases.

Richards.

An Anatomic Point in the Etiology of Naso-Pharyngeal Disease.

BROWNE, LENNOX. (*Phil. Med. Journal*, Aug. 26, 1899.) A reassertion of a statement first made in the author's text book (second ed. 1887) that "As a matter of experience I have long ago come to the conclusion that, while ease and completeness of postrhinal examination depend almost entirely on the amount of space at command between the uvula and the posterior pharyngeal wall, so also does this condition favor disease in the region under consideration—that is to say the wider the distance between the soft pal-

ate and the pharynx, the more surely one may expect on examination to find postnasal trouble." This statement which had been challenged by a reviewer in the *British Medical Journal* is confirmed by the report from Gerber's Poliklinik in Königsberg for the five years ending 1896 who says in referring to the etiology of ozena, "The nasal cavity is broader and shallower, the septum is shorter from before backward, and the depth of the naso-pharynx is increased. Measuring in 100 cases showed that in ozena the septum was shorter from before backwards by three milimeters, while the diameter of the naso-pharynx in the same direction was correspondingly increased." Lennox Browne explains this as due to a want of "correlation between the growth of the child and the ethmoid structures and began as an incident of embryonic life." He concludes by saying that atrophic rhinitis is associated with undue patency of the nasal orifice, nasal vestibule, nasal fossæ and of the naso-pharyngeal space. Opinions on this subject are invited by the author. *Richards.*

III.—MOUTH AND PHARYNX.

Tuberculosis of the Pharynx.

THEISEN, C. F. (*Journ. Amer. Med. Assn.*, August 12, 1899.) Two cases of pharyngeal tuberculosis are reported, one of which with pharyngeal uvular and tonsillar ulceration and with extensive lung involvement ran a rapid course and terminated in death six weeks after coming under observation; the other had a slight superficial pharyngeal ulceration directly back of the uvula with a small ulcer in the interarytenoid space. The pulmonary involvement was moderate. Under treatment with orthoform and lactic acid the pharyngeal ulceration healed. The author then discusses the differential diagnosis between this disease and carcinoma and syphilis and remarks that cases which clinically present all the appearances of tuberculosis frequently get well when iodide of potassium is administered (an experience which many others have had.) The question as to the part played by the tonsils and adenoid tissue in the etiology of tuberculosis is taken up and a preliminary report of some bacteriologic investigations

given. Tubercle bacilli were found in two tonsils but none in adenoid tissue. The author, however, believes that if all extirpated tonsils and adenoids were subjected to careful histologic and bacterial examination, tuberculous conditions would be more frequently found. An exhaustive bibliography follows.

Richards.

Accessory Thyroid Tumors at the Base of the Tongue.

SCHADLE, JACOB E. (*Journ. Amer. Med. Assn.*, Aug. 11, 1899.) The author records a case of accessory thyroid occurring in a woman of twenty-five who was anemic and complained of insomnia and gastric derangement. Although 133 lbs. in weight she was poorly nourished and evidences of nervous exhaustion were marked. At the base of the tongue was a tumor the size of an English walnut, covered with mucous membrane, intensely vascular, and at times almost entirely filling the fauces. During the menstrual period it was larger and more vascular. It was hard and immovable to the touch; there was no pain; speech was thick and non-resonant; the larynx and epiglottis were normal. Electrolysis reduced the size of the tumor somewhat but was followed frequently by considerable hemorrhage. The patient was referred to Dr. McBurney, who operated by a median incision from the symphysis menti to the hyoid bone, pushed aside the muscles of the base of the tongue and enucleated the tumor. Microscopically it was found to be a ductless gland of the thyroid type—an accessory thyroid. Dr. Schadle quotes some cases from the literature of the subject.

Richards.

Observations on Adenoids and Enlarged Tonsils and their Removal.

WISHART, D. J. GIBB. (*Phil. Medical Journal*, October, 1899.) A review based on 103 operations; males, 47; females, 56; faacial tonsils alone, 24; males, 6; females, 18; third tonsil alone, 31; males, 17; females, 14; faacial and pharyngeal tonsils, 48; males, 24; females, 24. Under five years of age 24%, between five and nine years 52% and over nine 24%. Nineteen cases were re-examined and twenty per cent. of these showed a persistence or recurrence of some portion of the growth. The author thinks the most satisfactory method of examination is by inspection through the nose and deprecates the examination by

means of the index finger in the pharynx of the child, since it is disagreeable for both patient and physician, endangering the loss of the child's confidence. He objects to any palliative procedures, regarding them as a waste of time, if there are positive symptoms dependent on these enlargements. As a rule and always when adenoids are present he operates under profound anesthesia and usually under chloroform and says that thorough work cannot be done by a hasty scraping of the naso-pharynx in a struggling patient. The recurrence of the growth if it takes place is to be expected in those cases where no anesthetic is used. He operates in the recumbent position, and after the tonsils have been removed draws the head down over the edge of the table for the removal of the adenoids.

Two cases resulted fatally, one from an attack of scarlet fever and the other from the anesthetic. (This latter may be added to the growing list of deaths from chloroform in connection with operations for the removal of adenoid growths—Reviewer.)

Richards.

Surgical Diseases of the Faucial Tonsils.

STRONG, T. M. (*N. E. Med. Gazette*, July, 1899.) A review of the subject in which the following points are emphasized: the anatomic construction of the supratonsillar fossa and its liability to retain secretion in the lacunæ. As the lacunæ are largely out of sight they may be easily overlooked and an insufficient amount of trouble be found to account for the symptoms complained of. Small tonsils with obstructed lacunæ may be more troublesome than much larger ones with wider open crypts. [The reviewer has several times had occasion to clinically verify these observations.] Cartilaginous or bony deposits in the tonsil are probably of congenital origin. There is a form of paroxysmal cough which has its origin in a pathologic condition of the tonsil, operating reflexly through the pneumogastric and a case history is given which evidences this. A young woman had a persistent hacking cough, evidently reflex. Careful examination failed to find its cause until the probe touched a point in the right tonsil, irritation of which produced a paroxysm of coughing. Repeated tests confirmed this although the tonsil was small and apparently not troublesome. Removal of the tonsil

cured the cough. A brief resumé of the usual operative procedures is given and the claim made that pure hydrogen dioxide is the best styptic for hemorrhage in the throat or nose.

Richards.

Peritonsillar Abscess.

COBB, FREDERICK C. (*Boston Medical and Surgical Journal*, July 27, 1899.) As a result of his anatomic studies the author has demonstrated that the pharyngomaxillary space can easily contain three or four drams of fluid and claims that many cases of peritonsillar abscess owe their clinical appearance to the accumulation of pus in this space, thereby forcing both the tonsil and peritonsillar tissues forward and upward. The pus is prevented from forcing its way backward among the great vessels of the neck by the septum formed of the styloglossus and stylopharyngeus muscles. Occasionally this burrowing has occurred. The cases seen were too far advanced for abortive treatment. The usual point selected for incision was in the median line above the tonsil, between the root of the uvula and the gingivopalatal fold. Some of the punctured cases closed too soon; this he regards as due to the varying direction of the muscle fibres of the anterior pillar and the superior constrictor, the openings sliding over each other so as to close the vent made by the knife. "By far the most usual point of passage of pus was found to be between the pillars of the fauces above this tonsil, suggesting that to puncture in this locality would be following nature's indication." He states that the date of relief was exactly the same in the unpunctured as in the punctured cases, viz., a fraction under seven days. Forty-four cases were examined and in none of them was there found to be any relation between rheumatism and peritonsillar abscess. The supratonsillar fossa and the infratonsillar space offer the surface for puncture most free from anatomic obstruction and puncture anterior to a plane passing through the posterior pillars cannot injure the great vessels if the knife be kept at all times anterior to such a plane.

Richards.

IV.—LARYNX

Diphtheria and Membranous Croup.

POTTER, THEODORE. (*Phil. Med. Journal*, July, 1899.) The two diseases are considered to be one and the same and the difference in constitutional severity is explained to be due to the different anatomic construction of the parts involved. "Admitting the undeniable fact that general toxemia in the modern bacteriologic sense is comparatively slight in membranous croup, though the germs of diphtheria are also undeniably present, we may explain the fact without violence to reason or established pathologic principles. The larynx is a cartilaginous box, lined over its larger part with a thin and tightly placed mucous membrane. This box is much less freely supplied with lymphatics and lymphoid structures, in a word, with absorbing structures. The nose, naso-pharynx, pharynx and fauces including the various aggregations of adenoid tissue called tonsils, form a very hot-bed not only for the growth of germs and the accumulation of morbid secretions, but furnish favorable conditions for the absorption of such morbid products. An acute laryngitis with hoarseness and mucopurulent expectoration is usually accompanied by but slight disturbances of a septic nature; and this, though the expectoration is swarming with bacteria. The same is true of an ordinary acute mucopurulent bronchitis. Only when the bronchitis extends into the deeper parts of the lungs, where the anatomic condition is quite different from that of the larynx and bronchial tubes, where the absorption is free and rapid, only then do high fever and the other evidences of sepsis appear. And so above the larynx, an acute mucopurulent tonsillitis, the so-called follicular tonsillitis, is usually complicated by high fever, by general septic intoxication.

Is not this the key to the situation in the typical cases of membranous laryngitis? The conditions and agents for absorption are present in but slight degree. It is strange, therefore, that there should be but slight cervical adenitis, but slight fever, and an entire lack of the general disturbances and degenerations of muscle, nerve center, kidney, and other glandular organs, which in naso-pharyngeal diphtheria result from toxins absorbed from a larger, more

active, deeper, and more freely absorbing diseased area?" The author thinks the isolated case of diphtheria occurs as often as the isolated case of membranous croup and regards both as primarily a local disease with secondary constitutional manifestations.

Richards.

The Treatment of Incipient Laryngeal Cancer.

SCHEPPEGREL, W. (*Med. News*, Aug. 5, 1899.) The only hope in any operative procedure is based on a very early diagnosis and complete immediate removal of all diseased tissue. If this cannot be done reliance must be had on palliative measures since "when the malignant disease has advanced to such a degree as to require the complete extirpation of the larynx for its removal the prognosis is not only very unfavorable but many operators have even doubted its justifiability on account of its attending danger, high mortality and the mutilated condition of the patient after the operation."

Successful endolaryngeal operations have been performed by several operators. It has the disadvantage that it is difficult to fix the limits of the disease and to totally eradicate. Thoyrotomy or some modification of it preceded by a tracheotomy seems to offer the best results with the least risk. If done early enough there is a fair chance of removing all the growth. Up to the present time the mortality in complete extirpation has been 84%; certainly a high mortality and sufficient to deter any but the boldest operator.

Richards.

Dysphonia—Relief With the Galvanic Current.

CHRISTY, T. C. (*Phil. Medical Journal* Sept. 9, 1899, Oct. 21, 1899.) After citing the various causes of dysphonia the author reports a number of cases showing the remarkable improvement which takes place under the use of the constant current. Its advantages are that it is easy of application; soothing and agreeable to the patient; relieves the congestion, pain and irritation; does not excite pain or spasm of the glottis or trachea; relieves the swollen lymphatic glands; cures more promptly than any other agent, while the patients recognize its value and return regularly for its application. An electrode is used which adjusts itself readily to the episternal notch. The active electrode is the positive and is placed first over the trachea

at the episternal notch while the negative is placed over the nape of the neck close to the hair line or over the thick muscular layers on either side of the neck. The posterior electrode is changed only to relieve the burning sensation which after long application sometimes becomes very acute, while the anterior is placed over the various portions of the larynx which are available. The strength of the current is adapted to the individual; it should not be painful. The operator should test the current before applying. As improvement takes place the strength of the current is to be weakened. The duration of the treatment depends on the strength of the current employed and on the degree of reddening of the skin which results. (5 to 10 minutes at a sitting.) It should be discontinued before producing pain. The electrodes are to be kept moist with warm salt solution and are not to be changed in position without first removing them from the patient. When the current is sent directly through the larynx, reduce the original current one half and tilt the electrodes on their sides. The aim of treatment "is to secure a current which is perfectly agreeable and soothing during the application and which relieves the condition existing if judiciously applied." (The reviewer can testify to the value of Dr. Christy's methods both as a treatment by itself and as an adjunct to local laryngeal applications. In sub-acute and chronic hoarseness with relaxation of the cords the application of the constant current as suggested by the author has produced better and quicker results than other methods, with the decided advantage that the treatment is not disagreeable to the patient. On the contrary they appreciate its value and return for its application.)

Richards.

Prognosis of Laryngeal Tuberculosis.

LEVY, ROBERT. (*Journ. Amer. Med. Assn.*, Sept. 16, 1899.) Dr. Levy regards laryngeal tuberculosis as more curable than it has been frequently considered. He admits that proof of cure is hard to get. He would regard a case as cured in which all active indications of disease fail to recur in two and in some cases after one year from their cessation. In the diagnosis, irregular spots of redness, characteristic anemia, typical infiltration and soft papillo-

matous excrescences are sufficient guides for the experienced. The cases of the infiltrative and papillomatous variety did better than the ulcerative. The pulmonary conditions may continue to grow worse at the same time that the laryngeal conditions are improving. No line of treatment is given; cases should be individualized and the treatment adapted to the needs of the particular patient.

Richards.

Remarks Concerning the Operative Treatment of Carcinoma of Larynx.

SENDZIAK, JOHANN. (*Monatschrift für Ohrenheilkunde*, Sept. 1890.) The author gives statistics concerning the operative treatment of 640 cases of malignant disease of larynx.

The year 1888, that of the death of Emperor Frederick III, he takes as a sort of culminating point and arranges his statistics accordingly as, "up to 1888," and "from 1888-1898." His classification of the various operations and results can be gathered from the accompanying schematic arrangement of his statistics as put together by the reviewer.

By *complete cure*, the author understands these cases with altogether favorable results for three years.

By *relative cure*, favorable conditions persisting for one year.

The operation of *partial excision* covers the cases where portions of the cartilages are removed, while *laryngo fissure* is limited entirely to operation on the soft parts.

His conclusions are as follows:

1. In the present condition of our knowledge of malignant disease of larynx, operative treatment is the only treatment justifiable.

2. Very favorable results are obtained when the operation is done during the early stages of the disease.

3. *Laryngo-fissure* and *partial excision* are the most successful methods. The first gives better results as to healing and is the safer, while the latter is more favorable as regards recurrence.

4. *Total extirpation* should not be considered too unsatisfactory although the statistics as to cure are not very favorable.

Allen.

OPERATION.	COMPLETE CURE.		RELATIVE CURE.		RECURRANCES.		DEATH AFTER		INSUFFICIENTLY OBSERVED.
	1st Period	2d Period	1st Period	2d Period	1st Period	2d Period	1st Period	2d Period	
Endolaryngeal.	9 cases, (25 pr ct.)	5 cases, (14 pr ct.)	14 cases, (39 pr ct.)						
36 cases in all. Up to 1888, 17 cases. After 1888, 19 cases.	5 cases (14 pr ct.)	4 cases (11 pr ct. +)	1 case (3 pr ct.)	4 cases (11 pr ct.)	7 cases (19.5 pr ct.)	7 cases (19.5 pr ct.)			
LARYGO-PISTURE.	17 cases, 12.5 pr ct.	17 cases, (12.5 pr ct.)	78 cases, 57.3 pr ct.						
(Thyroidectomy.)	1st Period	2d Period	1st Period	2d Period	1st Period	2d Period	1st Period	2d Period	
136 cases in all. Up to 1888, 55 cases. After 1888, 78 cases.	2 cases	15 cases	2 cases	15 cases	35 cases	23 cases	3 cases	9 cases	16 cases.
PARTIAL EXCISION.	26 cases, 12.0 pr ct.	20 cases, (10 pr ct.)	63 cases, (31.3 pr ct.)						
201 cases in all. Up to 1888, 55 cases. After 1888, 146 cases.	7 cases	19 cases	4 cases (2 pr ct.)	16 cases (8 pr ct.)	44 cases (11.5 pr ct.)	18 cases (21.8 pr ct.)	18 cases (9 pr ct.)	26 cases (12.9 pr ct.)	27 cases.
TOTAL EXCERATION.	12 cases, (4.4 pr ct.)	24 cases, (9 pr ct.)	81 cases, (30.3 pr ct.)						
207 cases in all. Up to 1888, 143 cases. After 1888, 124 cases.	8 cases (3 pr ct.)	4 cases (1.5 pr ct.)	9 cases (4.4 pr ct.)	15 cases (6.6 pr ct.)	51 cases (19.1 pr ct.)	30 cases (11.2 pr ct.)	56 cases (21 pr ct.)	38 cases (14.2 pr ct.)	In some the condition good after 9 months.

Gummata of the Larynx.

CORDES, H. (*Deutsche Medicinische Wochenschrift*, June, 1899.) The writer refers to the numerous clinical manifestations of syphilis and the difficulty often present in making a diagnosis without the aid of the microscope. By way of illustration he mentions the case of a woman, who consulted him for complete aphonia. Laryngeal examination showed infiltration of the left side of the larynx, involving the ary-epiglottic folds, arytenoid cartilage and ventricular band. Springing from the ventricular band a tumor was visible. No history of specific infection could be elicited and malignant disease was thought of. A small section of the growth was subjected to microscopic examination and iodid of potassium administered internally in large doses. Under this medication the growth disappeared, the infiltration became less and the patient made a complete recovery.

Oppenheimer.

A New Instrument for the Application of Nitrate of Silver in Substance to the Larynx.

CUBE. (*Deuts. Med. Wochensch.*, Aug., 1899.) The instrument consists of a piston syringe and a suitably bent canula, which is introduced into the larynx. The canula terminates in a solid button, with a shallow depression in the center. Melted stick silver is poured into the depression which is in the shape of a mould.

About the mould are a number of small openings through which a salt solution is injected after the silver nitrate has been applied. This protects the surrounding tissues from the action of the caustic. The author has been very successful with the use of the above instrument in the treatment of syphilitic ulcerations and small laryngeal polypi.

He cites the case of a singer whose voice became rough and hoarse in the middle and lower tones. On the left vocal cord was seen a condition of venous engorgement and dilatation. This well cauterized with a complete restoration of the singing voice.

Oppenheimer.

MISCELLANEOUS.**Phenol-natrio-sulfo-ricinicum in Rhinolaryngology.**

BAUMGARTEN, EGMONT. (*Wiener Klinische Wochenschrift*, No. 35, Aug., 1899.) The author gives his results

with this new remedy so highly recommended by Prof. Heryng. The substance is a mixture of synthetic phenol and the sulpho-ricinate of sodium. It is a yellowish brown, syrupy fluid, miscible with water and with a strong carbolic acid odor. It is a powerful antiseptic and deodorizes and causes no pain when rubbed upon the mucous membrane of nose or throat. It is to be employed as a local application in 20-30-50% solutions in water. The paper treats exhaustively of its use in the various affections of nose and throat. The author obtained no particularly beneficial results in tubercular laryngitis, although especially recommended by Heryng for this purpose. It cleans up tubercular and syphilitic ulcerations and prepares the way for the application of lactic acid to the former. Acute and chronic rhinitis and laryngitis are not benefited. It is in atrophic rhinitis, with or without ozena, that the author finds the remedy of great value. He has had the generally unfavorable results obtained by all, with the other remedies, including massage and copper electrolysis, but finds the local application of a 30% sol. of this remedy to be most useful. Odor is relieved, and cleansing made much easier, the good results lasting for months. The atrophy of course remains the same. The very conservative tone of the article recommends it highly, and it is more than probable that the remedy will prove of value.

Allen.

Beta-Eucain as an Anesthetic in Nose and Throat Work.

POOLE, WM. H. (*Detroit Med. News.*) Beta-eucain has all of the advantages of cocaine except that of shrinking the tissues, and this is sometimes objectionable, without certain positive disadvantages of the latter drug. The eucain solution can be made sterile by boiling without destroying its activity. In operations in the naso-pharynx, pharynx, larynx or nose a four to ten per cent solution is used. The effect of the drug is noticeable in two or three minutes, anesthesia is obtained in from five to ten and lasts from eighteen to twenty minutes. The author has never seen any heart depression or symptoms suggesting systematic poisoning. Following the anesthesia the disturbances of sensation have been much less defined and unpleasant than where cocaine was used. An instance is cited where an attempt to do an intranasal operation (Removing of

polypi) under cocaine produced alarming symptoms so that the operation had to be given up. The following day and several times after a four per cent. solution of eucain produced perfect anesthesia without the slightest unpleasant symptom. The reviewer has found the drug when applied in the nose to produce some smarting on its first introduction and its anesthesia to be not quite so complete as that of cocaine. It does not seem to be followed by congestion nor does the patient complain of a "cold in the head" which congestion is so very disagreeable to some patients after the use of cocaine in the nose.

Richards.

Our Tuberculous Patients—Where to send Them.

MCCONNELL, J. F. (*Journ. Amer. Med. Assn.*, Sept. 16, 1899.) Send very early cases to southern New Mexico and keep all late cases at their own homes. At an altitude of 3,800 feet pure air and an equable dry climate with 348 days of sunshine per annum is provided. This climate is an equitable one. Even in July and August when the days are hot the nights are cool. Cases of the fibroid type which do badly at high altitudes will do much better in New Mexico. The author states that the accommodations are good. (One of the troubles with many places which are climatically good is that the accommodations for the invalid are so poor as to practically preclude the availability of the locality. The consumptive patient sent a long ways from home must be well provided for in the way of food and other creature comforts—Reviewer.)

Richards.

Some Fallacies in the Modern Treatment of Nose and Throat Diseases.

ROY, DUNBAR. (*Medical News*, Aug. 19, 1899.) A plea for more thorough study of the individual case. By fallacies the author means the false recognition of pathologic conditions and the wrong remedy for the condition when it is recognized. He mentions the routine use of oily sprays; the abuse and improper use of the electric cautery and the needless removal of cartilaginous and bony spurs. All specialism should be preceded by several years of general practice.

Richards.

A Case of Stammering With Demonstration of the Methods Employed in Treatment.

MAKUEN, G. HUDSON (*N. Y. Med. Journ.*, Sept. 23.)

reports a patient, 29 years of age, who had stammered with varying severity since childhood. The chief characteristic was a spasmotic contraction of the muscles of the soft palate and tongue resulting in sudden closures during attempts at vocalization and articulation of the posterior palato-lingual cheek. The defect was more pronounced upon reading than upon speaking.

The primary neurosis responsible for the condition was located in the nerves supplying the muscles the respiratory organs, not in those of the pharynx as might be supposed from the location of the spasm.

The patient was given proper breathing exercises and was taught to compress the abdominal viscera by means of a voluntary action of the diaphragm and abdominal muscles and to make this compression greater or less according to the strength or intensity of the tone required. Exercises were also given for the control of both the levator and depressor thoracic muscles independently of voice and breath. When a combination of this newly acting mechanism was effected with the voice mechanism in the production of elementary sounds, he was instructed to carry the same principle into the enunciation of syllables. He has now not only overcome his difficulty but has at the same time acquired a more effective manner of speech.

Loeb.

TRANSACTIONS OF THE SIXTH INTERNATIONAL
OTOGLOSSICAL CONGRESS AT LONDON.*

PRESIDENTIAL ADDRESS.

THE GROWTH OF OTOLOGIC SCIENCE.

BY

URBAN PRITCHARD, M. D. EDIN, F. R. C. S., ENG.,
LONDON.

PROFESSOR OF AURAL SURGERY IN KING'S COLLEGE, LONDON.

In the name of the British Organization Committee, and in the name, indeed, of all British Otolologists, I wish to offer a very hearty welcome to our foreign colleagues and to their ladies.

We thank you most sincerely for coming here, in many cases hundreds—nay, even, I may say, thousands—of miles, in order to assist at this, the Sixth International Otological Congress, and I trust that your visit to London will be a very pleasant one; at any rate, I may certainly promise that we will do all in our power to make it so.

There is, however, one serious difficulty which, with all the good will in the world, cannot be removed. I refer to the fact that, owing to the immense size of this London of ours, so much loss of time is entailed in getting from place to place. When I remember how conveniently we were located during the pleasant gatherings of Congress at Basle, at Brussels, and at Florence, and the ease with which we were enabled to find our way about, I cannot help regretting that our vast metropolis cannot be, for the moment, brought within more manageable compass; but, as that is impossible, we must content ourselves with doing the best we can under the circumstances.

In bidding you welcome I have used the word "foreign" to our guests; but I do not like that designation in connection with our Congress. For Science acknowledges no

*From the Journal of Laryngology.

difference of nationality; she is herself all in all, and faithfulness to her the sole condition of citizenship in her kingdom.

Therefore let us regard ourselves, not as under our national flags, but as assembled in common brotherhood, marching together under the banner of Otology, and forming one part of that army, commanded by Science, which is engaged in overthrowing the foes of humanity, those foes which have Ignorance, Vice, and Prejudice for their leaders.

Personally, I feel a thrill of pleasure in seeing so many valued friends assembléd again for conference, and of these may I be permitted to mention the names of Professor Politzer, Professor Guye, Professor Lucae, Dr. Arthur Hartmann, Professor Knapp, Dr. Ménière, and our last President, Professor Grazzi.

But it is a real grief to miss some old familiar faces. The genial President at Basle, Burkhardt Merian, dear old Sapolini of Milan, Moos of Heidelberg, and Delstanche (*père*) of Brussels—these are honored names which will long be remembered in the annals of Otology, though they themselves have passed “behind the veil.”

Again, since our meeting in Florence, our branch of medical science has lost another faithful servant; I allude to Dr. Meyer of Copenhagen, whose name in connection with the discovery of post-nasal adenoids is so justly renowned. Lastly, among other names that must occur to each one of us, I will only refer to those of Professor Colladon of Geneva and Hewetson of Leeds, who were both to have taken an active part in our proceedings this week.

We deeply regret also to note the absence, from unavoidable circumstances, of several friends whom we should so gladly have welcomed among us to-day, and I am especially grieved that ill-health has prevented Dr. Charles Delstanche, our hospitable President at Brussels, from being at his accustomed place on this occasion. I believe that it is the first time that our Otological Congress has not had the support of his energetic and cheery presence.

Now, friends, it seems to me that at the opening of our Congress it is well that we should recall briefly the story of the birth and growth of Otological Science, and with your permission I will say a few words on this subject now,

dwelling more particularly on the advances made in it during the last thirty years.

Although Toynbee is generally acknowledged to be the father of *modern* Otology, for the date of its birth we must go back some 3,400 years to the then flourishing country of Egypt. For Professor Roosa, in his excellent treatise, refers to a certain ancient papyrus (called, after its discoverer, the *Papyrus Ebers*), on which is written a monograph on "Medicines for ears hard of hearing," and "for ears from which there is a putrid discharge." And here, in our Museum, may be seen a confirmation of the fact that ear troubles not only existed in those days, but that they could be cured; for we have the good fortune to possess a curious old Egyptian relic, consisting of a wooden tablet on which is portrayed in bas-relief two effigies of the Sacred Bull and two auricles; this was undoubtedly a votive offering to the god Hathor from some "grateful patient."

In spite of its early birth, however, Otology, except perhaps with regard to its anatomy and physiology, did not make itself of great importance until the second half of the present century. It is true that here and there a surgeon might have been found who had turned his attention to some extent to this subject; and, indeed, our own Royal Ear Hospital in Dean Street, Soho, which is acknowledged to have been the first successful aural clinique in Europe—and, I believe, in the world—was established in 1816. But, speaking generally, we may safely assert that aural surgery continued to be more or less in the stage of infancy until between 1840 and 1860, when the study was vigorously taken up by Sir William Wilde and Toynbee, who thus gave a fresh impetus to the study of the pathology and treatment of diseases of the ear. Even then its importance was by no means generally recognized; indeed, only thirty years ago it was a favorite saying of more than one celebrated surgeon that "Ear diseases may be divided into two classes: those which can be cured by any general practitioner, and those which, being incurable, may be relegated to the tender mercies of the ear specialist."

Is it any wonder, therefore, that in those days aural surgery was not only considered to be, but actually was, very much mixed up with the name of quackery; for, as sci-

tific men refused to have anything to do with it, the door was left open for any charlatan to enter, and many strange stories gained credence as to methods of treatment which the patient was required to undergo. Indeed, one of my earliest boyish recollections of aural surgery was hearing the story of how a child, a deaf-mute, had been cured by a skewer having been passed through his head from one ear to the other. Although a somewhat better knowledge of anatomy has since made me doubt the accuracy of this statement, still it is certain that strange things were both said and done in the olden times, which did not redound greatly to the honor of the specialist.

In my own student days I well remember the sarcastic manner of Professor Partridge—Dickey, as we used to call him at King's College—when he said, "Ah, gentlemen, a little wax is a godsend to an aurist," meaning, of course, that its removal was an easy method of earning a reputation. And no doubt there is a certain truth in these words, though not exactly in the sense implied by the good old Professor; for which of us has not found that, by removing a plug of cerumen which has either not been diagnosed or which has resisted all the efforts of the general practitioner to dislodge, we have gained *kudos* and an appreciation which many of our more delicate operations have failed to secure.

Yes, Otology had indeed a hard battle to fight before it could be said to have won honorable recognition among men of standing in the medical profession, and I shall never forget the letter which one of these wrote to me in 1872 when he first learnt that I intended to devote myself to this branch of study. After lamenting my decision, however, he did conclude by saying, "*Now I suppose that I must not regard all aural surgeons as quacks.*" And may I add, as a kind of commentary on this letter, that within a few years afterwards the writer of it came to me as a patient.

Things have indeed changed since then, for, instead of a few aural surgeons scattered here and there in Great Britain, we have now at least a couple of hundred, while the number of cliniques in London alone has been increased from two or three to near upon twenty. And in many other countries this branch of medical science is even more strongly represented.

As a natural result of the increased interest in the work, let me call attention to the unique Museum connected with this Congress, wherein is to be found the largest and most valuable collection of otologic specimens—a collection which could only have been brought together by the union of our international forces. The Museum is so complete that if you had come to visit that alone your trouble would have been repaid.

But in one respect there is still room for improvement. I refer to the need for the better recognition of otology by our universities and colleges. I am glad, however, to be able to report that one step has lately been made in this direction, for the University of Edinburgh has now made it one of the qualifying subjects for her medical degrees, and I look forward, with hope, to the time when her example will have been generally followed.

This "new departure" will, I trust, lead to a fuller recognition of the position of teachers of aural surgery. In this respect we, in the British Isles, are sadly behind other countries, where chairs of otology are numerous; whereas here, among all our universities and colleges, where so many able lecturers are to be found, in King's College, London, alone is the dignity of a professorship conferred upon its teacher of aural surgery.

Let me now pass in brief review the progress of the last thirty years.

So far as the *anatomy* and *physiology* of the auditory apparatus are concerned comparatively little has been added to the store of knowledge already gained, although a more intimate study of its parts has made that knowledge more complete and precise.

In *pathology*, as may be expected, there has been considerable advance.

In diseases of the meatus, although *aspergillus* was discovered before this period by Meyer, Schwartz, and Wreden, yet it was not elaborated with any fulness until later. Also, the nature and classification of exostoses have been worked out within this period.

Our knowledge of the changes in chronic middle-ear catarrh, and in sclerosis, has considerably advanced, although much here yet remains to be done.

The effect of pathologic conditions of the nose and

naso-pharynx upon the auditory apparatus, adenoid vegetations more especially, has practically been discovered. The world has yet to learn what it owes to Meyer.

In chronic suppurative catarrh, disease of the ossicles, the implication of the attic, the antrum and the mastoid cells have been worked out; also the intercranial complications which sometimes follow. The nature of the granulations and polypi are now better understood; and although Toynbee had already called our attention to cholesteatoma, its pathologic importance in connection with mastoid disease was not fully realized until quite lately.

In the pathology of labyrinthine disease there has not, perhaps, been so much advance; but Ménière's disease is now better understood; and Politzer has made known to us a disease of the bony capsule. Finally, the pathology of congenital syphilis affecting the internal ear has been partially worked out.

Our means of diagnosis have been considerably improved.

The diagnosis between affections of the conducting apparatus and the auditory nerve, which formerly was often confused, is now much more easily made out; this is chiefly due to the study of the tuning fork.

Methods of illumination have very greatly improved, to the immense advantage of the surgeon.

Bacteriology, again, has done much, and in all probability will do even more in the future, to help us in our diagnosis. Unfortunately, the essential apparatus is enclosed in such dense bone that the Roentgen rays have been of but little assistance.

In treatment there have been immense strides.

Even in chronic middle-ear catarrh and in sclerosis, those diseases which hitherto have baffled our most strenuous efforts, a distinct advance has been made indirectly, especially in prophylaxis, by treatment of the nose and naso-pharynx.

In suppurative disease there has been very great improvement in treatment. By means of boric acid, alcohol, and other suitable antiseptics, simple otorrhea has become much more manageable; and a far larger proportion of such cases are now healed, even without operation.

In the case of its complications—caries, granulations, and polypi—the advance made is most striking, and, in

consequence, the large protruding polypus is now rarely seen; and no aural surgeon at the present time would be able to show so large a collection of these as Dr. Warden, of Birmingham, was in the habit of displaying some twenty-five to thirty years ago.

Curetting of carious spots, and the removal of ossicles, so important in the treatment of many cases, has only recently been introduced.

This brings us to the wonderful stride made in the treatment of antrum and mastoid disease, for which we have chiefly to thank Professors Schwartz and Stacke, although many others have contributed to the advancement. How much agony has been relieved, how many lives have been saved, by these operations!

And, gentlemen, this advance of surgery has carried us still further; for, by the joining hands of general surgery and otology, intercranial suppuration has been robbed of many of its victims.

But how, and why, is this? How is it that, formerly, our surgeons were unable to cope with those intercranial conditions? How is it that, now, we are able to operate on the tympanum, attic and mastoid, practically with impunity?

Gentlemen, this is due to the adoption of antiseptic surgery. May I beg your indulgence for proudly claiming to be pupil, colleague, and brother professor of him whom I regard as the greatest man living to-day—Lord Lister. Were it not that you would exclaim at my inconsistency, I should be tempted to add “compatriot” also. But yes, gentlemen, I will add the word. Not, however, in the sense in which I was just about to use it, that of English nationality; but with reference to that ideal country to which I alluded at the beginning of my speech, and of which we otologists are all naturalized subjects. Here, on the common ground of our chosen land, the land of science, we may all proudly claim Lord Lister as our compatriot, all rejoice to serve under such a leader in the battle against disease and death. The world does not as yet understand the full benefits which he has conferred upon mankind, but we, naturally, being his compatriots, have a better opportunity for doing so; and I can only add my earnest conviction that it is by faithfully following the

counsels of our superior officer that our advancing column can best secure future victories.

Such, ladies, and gentlemen, is the brief, and therefore necessarily inadequate, record of the progress of otology which I desired to lay before you.

We have seen that this nineteenth century, which has brought to the world so many wonderful blessings in other directions, has not been unmindful of our branch of medical science. For, whereas at the commencement of the century the ear was regarded almost as a *terra incognita* scarcely worth consideration except as the seat of one affection only—that which was generally known as ‘a deafness’ now, at its close, this organ is fully-explored ground, and has been proved well worth the exploration. Otology has been raised from the rank of pseudo-quackery to an honorable position in scientific surgery, and its importance and bearing upon the body as a whole is now fully recognized.

But while we rejoice in the progress made in the past, we must remember that much still remains to be done. For instance, we have yet to clear away that opprobrium of aural surgery, namely, the chronic non-suppurative disease of the middle ear. Shall we, in the near future, be enabled to cope successfully with this hitherto invincible foe? Judging from the advance made in other directions I am bold enough, and sanguine enough, to think that we shall; and assuredly when that help comes we shall all unite in blessing its victor.

Now, it is the province of our Otological Congresses to take this and similar problems into consideration. But the real value of these gatherings is not to be measured merely by papers and discussions. This is one of their uses, it is true, for interchange of ideas is always good; still, the chief value of thus meeting together with others who are all interested in one common subject is the kindling of enthusiasm which is thus engendered, an enthusiasm which should serve to stimulate older and younger members alike to renewed efforts in the paths both of research and of practical treatment; and, therefore, in conclusion, I desire most heartily to wish that this, our sixth Congress, may be successful in all these directions.

A New Method of measuring the Quantitative Hearing-power by Means of Tuning-forks. By Dr. SCHMIEGELOW (Copenhagen).

Many experiments, he said, had been made in later years to find a reliable method. There were the methods of Hartmann, Gradenigo, and Zwaardemaker, which, however, could not be called satisfactory, as they did not give exact results. In order to use the time and vibration of certain tuning-forks in measuring the hearing power, it was necessary to know the vibration curve. If it were possible to measure the amplitude of each tuning-fork from the moment it was set in vibration to the moment when the tone died away, the difficulty in using forks as reliable tests of quantitative hearing would be solved. In the light of our present knowledge the amplitudes of the deeper forks only were measurable. Bezold and Edelmann had, by means of a very cleverly invented instrument, constructed vibration curves of the deeper forks (from D¹ to F), and from these they constructed a standard curve. They furthermore presumed that this curve, being almost the same in all the deeper forks, must be the same for every fork, even the highest ones. It seemed, however, said Dr. Schmieelow, that Bezold and Edelmann had started from wrong conclusions, and that the result of their experiments did not agree with theory. According to theory, the amplitudes decreased at an approximately geometric progression; that was to say, the logarithms of the amplitudes diminished directly with the time. This theory was no doubt correct, but only as far as the small amplitudes were concerned (Jacobson), or, in other words, the logarithmic decrement was greater and irregular at the beginning, but towards the end it became nearly constant. By a very carefully drawn mathematical diagram, Dr. Schmieelow showed that in an examination of the curve found by Bezold and Edelmann it would be seen that the differences between the logarithms of the amplitudes corresponding to the time of 0-10-20, etc., -100 seconds to begin with, decreased as they ought to do, but afterwards increased what they ought not to do. According to theory they should expect that the difference, after decreasing as it did to 0·151, ought to remain pretty nearly constant.

The difference, however, increased again, which meant that for some reason or other the vibrations were impeded at an increasing rate, and the curve therefore not correct. Everything tended to prove that the curve of the higher fork was different from that of the deeper ones, and that such fork had its own special curve. In order to find the curve of vibration for each tuning fork G. Forchhammer and I proposed the following method: A tuning-fork is struck, and the time during which it is heard at different distances from the ear is determined. The abscissas of the curve represent the distances, the ordinates the time of perception. The correctness of this method, said Dr. Schmiegelow, was founded on the fact that the amplitude was proportional to the distance at which the tone disappeared, the intensity of the tone being constant when the "Hörschwelle" was reached of the moment at which the tone ceased to be heard. The method was also practicable, in so far that instead of the microscopic amplitudes the macroscopic distances were measured, an advantage which was all the greater because the amplitude of the higher tuning-forks could not be measured microscopically. The forks examined were made by Edelmann in Munich, and were C G, c g, c¹ g¹, c² g², c³ g³, all of them unloaded.

The experiments were made under as good conditions as could possibly be procured in the open air at some distance from town. If, for instance, they were going to find the curve of the c¹ fork (261 vibrations), they would proceed in the following way: By six series of experiments they found that c¹ properly struck would be normally heard for 7 seconds at a distance of 160 cm. from the ear, 14 seconds at a distance of 80 cm., 23 seconds at 40 cm., 37 seconds at 20 cm., 62 seconds at 10 cm., 88 seconds at 5 cm., and 117 seconds when held as close to the ear as possible without touching it. According to the theory, the differences between the time at a distance of 5-10 cm. and the distances 10-20 cm. should be the same, because close to the ear, where they had to do with small amplitudes, the time increased at an arithmetic ratio (with constant differences) if the distance diminished at a geometric ratio. This theory was actually proved by the experiments. At the beginning of the curve (from 160-20 cm. distance) they found that the differences in time were smaller at the

greater distances from the ear, that they increased up to about 20 cm. distance, and then became constant as far as the final part of the curve was concerned. The fact was that a tuning-fork did not emit the tone from the external surface of the prongs, but the vibrations were presumed to spread out from two points which were situated between the external surfaces of the prongs. By a series of experiments they had found that the distance between the tone center and external surface of the tuning-fork was about 1 cm. in the forks C G, c g, c¹ g¹, and c², whilst the distance was about 1·5 cm. in the forks g² c³ g³ c⁴ g⁴ c⁵. As the distances were reckoned from that surface of the prong which faced the ear, they must therefore add to the distance 5-10 and 20 cm., the distance of the tone center from the external surface of the tuning-fork. With regard to the fork c¹ the addition would be 1 cm.

They were now able by means of calculated value of x and other experimentally found data to construct the curve for c¹.

If the patient heard the fork c¹, for instance, 7 seconds, the fork being struck powerfully and held close to the ear, it meant that the patient's minimum hearing amplitude, or his "Hörschwelle," was $\frac{160}{1\cdot3} = 123$ times the normal for

the distance. His hearing-power $\frac{1}{(123)^2} = \frac{1}{15129}$ of $\frac{1}{123}$ times. If the normal hearing power is equal to 1, the reduced hearing-power would be equal to 0·00007. Supposing, on the contrary, the patient heard the fork 62 seconds, his minimum hearing amplitude would be $\frac{11}{1\cdot3} = 8\cdot5$ times the normal for the distance. His hear-

ing-power $\frac{1}{8\cdot5^2} = \frac{1}{72\cdot25}$ times 1 normal $\frac{1}{8\cdot5}$ times the normal, and = 0·0138 if the normal hearing-power was equal to 1.

In this way they were able to construct the curve of every tuning-fork, and thereby to find how much the hearing power was diminished, if they only knew the time for which the fork was heard at a certain distance from the ear.

By comparing the curves of the different forks, they now

saw how greatly they differed. Some of them—the deeper forks—were steep and short; others—the higher forks—were flattened and long. In other words, the assumption of Bezold and Edelmann, that the curves were always the same was not correct, and one employing their method could not get at reliable results. This could easily be illustrated by some examples. For instance, the forks $c - g^1 - g^2 - c^4$. They were, according to his experiments, normally heard close to the ear during .328, .202, .162, .55, and .43 seconds respectively. Suppose they had a patient who heard these forks only for half the time, the normal hearing-power would, according to Bezold and Edelmann, for all hearing forks be equal $0\cdot049 = \frac{1}{20}$. If, on the contrary, they used the special curve of each fork, the result would be quite different, because they found that the decrease of the hearing power for c would be equal to $0\cdot026 = \frac{3}{5}$ of the normal hearing; g^1 , $0\cdot0012 = \frac{1}{14}$ of the normal hearing; g^2 , $0\cdot00006 = \frac{1}{17500}$ of the normal hearing; and c^4 , $0\cdot000025 = \frac{1}{40000}$ of the normal hearing.

The enormous difference between the results given by this and by Bezold-Edelmann's method was obvious. He therefore believed that if one wished to use the time in which a fork was heard to measure the quantitative hearing-power, it would first of all be necessary to know the curve of the forks employed. In order to find these curves, he hoped the method he had given would be useful.

Dr. SCHMIEGELOW, replying to questions by Professor POLITZER and Dr. DUNDAS GRANT, said the experiments he had carried out were in connection with the mathematic aspect of the hearing-power. In the clinical world they had used the very good and practical methods of Dr. Hartmann, but he thought they were far from reliable. If they wanted to compare the result of the hearing-power by the different tuning-forks, and to know the influence on the voice, they could not get any certain basis to work upon. He was only as yet on the fringe of the question.

A Scheme for the Uniform Notation of the Results of Investigation of Hearing-power. By Professor Dr. GIUSEPPE GRADENIGO (Turin).

The methods which he proposes have been already for

some time used with good practical effects in the Clinic and in the Polyclinic at Turin. The language employed is Latin. The various experiments are indicated by the initial letters of the authors' names who have described them. Here is the scheme:

	AD
S (18") W	R (+16"), H, Hm, Ht, P, v, V,
	AS
	AD
	C e c ¹ c ² c ³ c ⁴ c ⁵ .
	AS

Explanation.

AD, AS=Auris dextera, auris sinistra.

S=Schwabach's experiment (e=128 vibr.). Duration of normal perception with own tuning-fork e=18".

W=Weber's experiment (o). An arrow designates the side towards which the lateralization takes place.

R=Rinne's experiment (C). Normal perception with own tuning-fork C=+16.

H, Hm, Ht=Horologium, watch per aer, ad mastoidem, ad tempora.

P=Politzer's acoumeter.

v=vox aphona, whispering voice; V=vox communis, conversational voice.

The results of the measuring of the hearing-power for the various tuning-forks are expressed in hundredths of the normal duration of perception.

The following example will better demonstrate the method:

	/AD-I		prope	+	+	5	0·30-0·15	>5
S (18)+6W	R	(+16)	H,	Hm,	Ht,	P	v	V
	AS-15"		0·05	+	+	>5	2·00-1·00	<5
AD	12	42	72	95	100	95	100	
C	e	c ¹	c ²	c ³	c ⁴	c ⁵		
AS	50	80	87	95	100	100	100	

Experimental Investigations on Acoustic Phenomena in Fluid Media. By Dr. R. KAYSER (Breslau).

The final sound-vibrations, Dr. Kayser said, which determine hearing take place in the cochlea, and therefore in a fluid medium. It has hitherto been impossible to investigate the conduct of vibrating bodies in fluids, because there has been no means of recognizing with any ease the vibrations of a body in water. He said he had, however, found a method of overcoming the difficulty. It consists

in the use of a telephone, which is so modified that the plate of metal is surrounded on all sides by liquid. (Dr. Kayser then gave a description of this water-telephone.) By means of this method it has been easy to prove that spoken sounds, or the sound of a tuning-fork in front of the plate, throw the metallic plate into feebler vibrations than when there is no water present. Low tuning-forks from C¹ downwards, and high ones from C⁴ upwards, are not heard at all. If we imitate the conditions in the ear, with two openings closed by means of membranes (*fenestra ovalis* and *fenestra rotunda*), and put one of these openings in communication (by means of a columella) with a membrane corresponding to the *membrana tympani*, the following takes place: If the second opening is closed by means of any unyielding mass so that a distension of the fluid outwards is prevented, then the production of a sound in the telephone is no weaker than when similar distension of the fluid is present. It thus appears to result from this experimental proof that the molecular vibrations of the auditory ossicles have a greater significance than they were credited with according to the theory of Helmholtz, at present held. Further, it is proved by means of the water-telephone that the diminution of the intensity of vibrations is increased in proportion to the bulk of liquid which lies upon the metal plate, and the degree of its viscosity. In glycerine or milk the diminution of the intensity of the vibrations is markedly greater than in water.

Professor LUCÆ said: It is not surprising that the sound should get weaker whenever you put a sounding tuning-fork into the water; it is new, however, that certain sounds, the higher and lower ones, should get lost. If you put a sounding tuning-fork into the water, the sound gets lower up to the extent of an octave. Whether the human voice gets so much lower too is the next question. Because the sound gets so much lower by the pressure of the water, it does not necessarily imply this.

Dr. KAYSER, closing the discussion, said: It is a well-known fact that the tuning-fork loses in height under water, but I do not know whether it is as much as an octave. However, with the telephone under water this could be easily proved. The tuning-fork is made to sound under the water, and the receiver on the other end will

give undeniable evidence. The lowering may be a fifth, but hardly an octave. The human voice is not influenced. It may be difficult to prove that actually, but so far I could not find any evidence of it.

A New Optic Method of Acoumetry. By Professor GIUSEPPE GRADENIGO (Turin).

If we paint at the end of one of the branches of a tuning-fork which vibrates with sufficient amplitude a distinct figure (say a tall triangle), this figure will appear more or less doubled. The duplicate images will overlap, the overlapping part being very distinct in outline and color (*field of double image*), while the separate portions will be much paler and less distinct in outline (*field of single image*). As the vibrations diminish in amplitude the "field of double image" becomes greater—the two images gradually merging into one. The growth of the field of double image corresponds to the diminution of the amplitude of the vibrations of which it thus becomes a measure.

When we choose a figure in form of an inverted V (A), black upon white ground, and if we mark it transversely with lines or steps forming various segments, we can in this manner obtain an exact index of the amplitudes of vibrations at any instant of the tuning-fork's decrement. Since the amplitude of vibration is directly proportionate to intensity of the sound, we have thus an excellent clinical method of acoumetry. Professor Gradenigo expressed his thanks to Dr. G. Ostino, Professor C. Raymond, Dr. C. Gaudenzi, and Dr. O. Pes for their valuable help in these researches.

The best results are obtained with forks whose branches make wide excursions (up to 60 vibrations a second); but the method can also be used with forks up to 250 vibrations.

As the examination with low notes is of great value in the study of the affections of the sound-conducting apparatus, the method is very useful in spite of this limitation.

Of the facts which he had been able to elicit, he wished only here to refer to the two following ones:

1. In the vibration's period measured with the said method, the decrement of amplitude goes according to the geometrical progression in proportion to the time.

2. The individual mistakes in the appreciation of the duration of the sound-perception in persons not accustomed to this kind of researches—that is, in most of our patients—are much greater than one would believe without such a direct objective control.

Dr. W. MILLIGAN (Manchester). *Some Observations upon the Diagnosis and Treatment of Tuberculous Disease of the Middle Ear and Adjoining Mastoid Cells.*

Mr. President and Gentlemen.—The widespread interest which has of late been manifested in this and other countries in the endeavor to check the ravages of tuberculous disease in its numerous forms has an interest to the otologist, not only on account of the general merits of the case, but more especially on account of the frequency with which tuberculous lesions are met with in and around the middle ear.

The factors which come into play in producing tuberculous lesions of the middle ear and its adnexa are but imperfectly understood, and their investigation opens up a wide field for research and experiment.

Does the bacillus gain entrance to the middle ear by way of the Eustachian tube, or is it conveyed along vascular or lymphatic channels? What also is the relation between tuberculous naso-pharyngeal adenoid vegetations and tuberculous middle-ear diseases?

Questions such as these are not easily answered, and yet their solution must appeal to all as being of much importance.

For some years past I have been particularly interested in this subject, and as opportunity has presented itself, have endeavored to investigate these questions both in their practical and in their scientific aspects.

That a large proportion of the cases of suppurative middle-ear disease with accompanying bone lesions met with in practice are of a tuberculous nature will, I think, be admitted by all, and that the prognosis in such cases is not very favorable will, I believe, be conceded by those who have had large clinical experience.

The characteristic features of tuberculous middle-ear disease may be somewhat masked on account of an accom-

panying pathogenic infection, and an accurate diagnosis may be impossible if one relies upon finding the bacillus of tubercle in the secretion from the middle ear.

Time after time it has been my experience to examine cover-glass preparations of pus from the middle ear for bacilli, and with negative results, although the tuberculous nature of the lesion has been proved beyond all doubt by means of inoculation experiments and by the subsequent clinical history of the case.

In my experience primary tuberculous lesions of the middle ear and adjoining mastoid cells are comparatively common, especially among the children of the poorer classes, and I believe also that secondary tuberculous infection from such a primary focus is by no means of infrequent occurrence.

Amongst causes which may be considered predisposing are the following: (1) hereditary tendency; (2) unhealthy environment; (3) unsuitable feeding; (4) exposure to infection from tuberculous relatives; (5) the presence of tuberculous naso-pharyngeal adenoids.

The relation of nasal obstruction to tuberculous middle-ear disease deserves special consideration. In many of my cases post-nasal adenoids have been present, and in a small proportion have themselves been tuberculous. The almost constant degree of Eustachian catarrh which their presence implies produces a soil which is favorable to the growth of the tubercle bacillus, and once it has found a footing in the middle ear the conditions favorable to its development are present, viz., a suitable soil, absence of light, a more or less uniform temperature, etc.

In the early stages these tuberculous foci appear as slightly elevated yellowish points in the mucosa, after a time coalescing and breaking down to form superficial ulcers.

Should the deposit occur upon the inner aspect of the membrane, perforation ensues. Such perforations may be multiple, and the destruction of tissue is usually quite painless. The edges of such perforations have a pale, indolent-looking appearance, and the accompanying discharge from the ear is usually thin, ichorous, and frequently fetid.

Within the mastoid cells such deposits are also frequent,

and I am inclined to think that in some cases, at least, the disease begins first of all within the mastoid, and subsequently spreads to the middle ear. At a very early stage the bone becomes affected, and undergoes an amount of destruction which is almost inconceivable, considering the comparatively slight external indications present. In some cases which have come under my observation practically the entire cancellous tissue of the mastoid—occasionally of both mastoids—has been eaten away, leaving merely a bony shell upon which the middle fossa is poised. Owing to this early and extensive destruction of bone, the facial nerve in part of its course is exposed, with resulting facial paralysis. In fact, early facial paralysis in a case in which sthenic symptoms have been absent should, I hold, always be looked upon with suspicion and as a probable manifestation of an underlying tuberculous lesion. Early implication and enlargement of the glandular structures around the ear is also a most important symptom, and when masses of enlarged glands occur around the ear any discharge from the tympanic cavity should be microscopically examined for bacilli.

To definitely establish the fact that the aural lesion is of a tuberculous nature the characteristic bacillus must be found. This may be an exceedingly difficult task, but in all cases it is worth while staining and examining the secretion from the middle ear.

Should no evidence of its presence be found in this way, small pieces of granulation tissue may be removed by forceps pressed between two cover-glasses and stained in a suitable manner. Occasionally bacilli will be found in such preparations. The method which I believe gives the most reliable results, however, is the inoculation of guinea-pigs with small fragments of tissue removed from the middle ear or adjoining mastoid cells, and I believe that it is advisable to inoculate with fragments of bone and mucous membrane removed from an area where the disease is seen to be advancing. In many such cases when the mastoid has been opened for the purposes of treatment, a pultaceous-looking mass will be found filling up the cavity, but this material is practically valueless for experimental purposes, consisting as it does of broken-down tissue, inspissated purulent débris, and epithelial cells.

When, however, it has been removed by means of a spoon and the underlying bone exposed, it will be seen where the disease is making progress, and from where a scraping of bone should be taken. In my experiments I have inserted a fragment of tissue obtained as above described into a guinea-pig's hind leg just about the knee-joint, all hair having previously been removed by singeing with a platinum knife. A small pocket is now made with a sterilized needle, and the tissue carefully inserted. In a few weeks' time, should the tissue inoculated be tuberculous, the inguinal glands will be found enlarged, and as time goes on the tuberculous virus will be found to have spread over the animal's body, the glands and viscera being attacked in the following order, according to the results obtained by Professor Delépine:

During the second week after inoculation the lymphatic ganglia upon the same side of the body below the diaphragm and the spleen will be found enlarged.

During the third week, the liver, the mediastinal and the bronchial ganglia.

During the fourth week, the lungs, the cervical and the axillary ganglia.

After the fourth week some of the lymphatic ganglia of the opposite side of the body below the diaphragm become affected, but this takes place extremely slowly, and the sublumbar and popliteal glands escape for a considerable time.

Microscopic sections made from these glands, and stained for bacilli, will frequently be found to reveal their presence.

In this way a definite diagnosis of the actual character of the underlying lesion can be made, and the value of the knowledge thus obtained is naturally immense, both as regards prognosis and treatment.

The course of such tuberculous lesions is only too often a downward one, despite the most elaborate and painstaking treatment. The practical difficulties encountered in removing tuberculous deposits within bone are immense, and in no region of the body are these difficulties greater than when tubercle attacks the temporal bone, for reasons which must be obvious to all here.

The complications which have to be feared are: (1)

meningitis, (2) tubercular enteritis, (3) general marasmus.

The treatment of such cases must be considered from two points of view, according as it is non-operative or operative. Cases will be met with, especially in infants, where any operative interference will from the first be seen to be hopeless.

Such are the cases where marked debility and emaciation are present, where advanced facial paralysis and masses of enlarged glands have been early symptoms, and where the discharge is abundant, fetid, and frequently blood-stained. In such cases palliative measures, anti-septic treatment, and, if possible, residence at the seaside, are indicated, but I am bound to say that in the majority of such patients whose cases I have followed an early death has been the usual history. The prognosis in such cases I believe to be essentially bad.

In other cases, however, where the present condition of the patient is good (and often enough it is so), and where the tuberculous lesion may be regarded as primary and local, much can be done by suitable operative interference. It is almost superfluous to say that the first and the main essential is to provide free drainage. This implies opening and cleansing the mastoid cells, and it is a remarkable fact how often in such cases, without any external and objective sign or indication, the mastoid cortex will be found extensively perforated, and a pultaceous mass immediately exposed to view. Under good illumination a very careful toilet of the part should be effected, and this can generally best be done by means of a sharp spoon. All softened and carious bone must be scraped away, and as smooth a cavity left as possible, even if this necessitates laying bare the dura and walls of the lateral sinus. The cavity thus obtained should be allowed to granulate from the bottom, and care must be taken to stimulate any sluggish area by means of applications of chlorid of zinc, nitrate of silver, etc. Frequently more than one scraping is necessary as fresh foci of disease appear. In one particular case which came under my treatment some years ago, and where the cause was proved to have been feeding with milk from a tubercular cow, five separate operations had to be undertaken before the morbid process was eradicated, which, however, it

finally was, and the child has now grown up a healthy and sturdy boy. In very many of the cases the middle ear has been so extensively destroyed that its function as an organ of sense may be disregarded. Under such circumstances its contents should be freely curetted, and middle ear, antrum, and mastoid cells thrown into one cavity, and allowed to become obliterated by means of healthy granulation tissue. Where, however, a fair degree of hearing is present, efforts should be made to preserve the function of the organ as far as is possible.

An important point arises in connection with the treatment of the accompanying enlarged glands. Some of the glands may be enlarged purely as the result of septic absorption, and if the morbid cause be removed this enlargement will gradually subside, especially if aided by suitable treatment. But many of the glands are of a tuberculous nature, and are prone to undergo caseous degeneration, while at the same time they are a source of possible systemic infection. Hence I hold that after the mastoid area and the cavity of the middle ear have been attended to, and as soon as the condition of the patient admits of it, another operation should be undertaken with the object of removing these enlarged and tuberculous structures.

The facial paralysis which so often accompanies tuberculous disease of the middle ear is unfortunately usually permanent. Something may, however, be done by facial massage, and the internal administration of strychnia to assist in maintaining the tonus of the facial muscles.

General treatment, such as the exhibition of cod-liver-oil, iodide of iron, syrup of iodine, etc., is useful, as also is change of air and liberal diet. The general conclusions from a study of these cases may be summarized as follows:

1. That primary tuberculous disease in and around the middle ear is of fairly frequent occurrence, and that it most usually attacks the children of the poor, especially the poor of our larger cities.
2. That a generalized tuberculous infection may arise from a primary focus within or around the middle ear.
3. That the prognosis in such cases is not very favorable, at least 40 to 50 per cent. of the cases succumbing, even after operative treatment has been undertaken.

4. That in many of the cases operative interference is contra-indicated, owing to the extent of the existing disease and the asthenic condition of the patients.
5. That when operative interference is feasible, the main object should be to scrape away all available foci of disease and to provide efficient drainage.
6. That the best and the most reliable means of establishing the tuberculous nature of the disease is by means of properly-conducted inoculation experiments.

Dr. ARTHUR HARTMANN (Berlin) read a paper on *Con-genital and Acquired Atresia of the Meatus Externus*.

Dr. Hartmann referred to previous reports on atresia auris congenita, which he considers should more correctly be regarded as absence of the external meatus.

He demonstrated two preparations with plaster casts of the rudimentary external ears of the same.

The first specimen was from a new-born infant, in which on both sides there was complete absence of the annulus tympanicus and membrana tympani, whilst the tympanic cavities and ossicles, though present, were not quite normally developed. In the second specimen, from an adult, the external meatus—*i. e.*, the pars tympanica and membrana tympani—was completely wanting. The articular surface for the jaw was on the anterior surface of that portion of the temporal bone which normally forms the posterior wall of the meatus. In this case also the tympanic cavity, the ossicles, and the antrum mastoideum were somewhat abnormally developed.

These specimens were important in their bearing on the question of the operative establishment of an external auditory meatus in cases of atresia congenita. They showed that this was not possible.

It is well known that even with both meatuses absent, hearing and understanding of speech can exist.

Reports of complete acquired closure of the meatus were rarer than those of congenital absence of the meatus. Dr. Hartman reported a case he had seen in which after diphtheritic-scarlatinal otitis the ossicles on both sides came away, and later complete bilateral bony occlusion of the meatus supervened.

Sufficient hearing-power remained to prevent the onset of deaf-mutism, loud speech being heard. On one side the meatus was restored by operation. After turning forward the auricle the new-formed bone was chiselled away, and the cavities of the middle ear laid bare, as in the radical operation. The meatus was covered by means of Körner's flaps. Healing was very slow. The hearing was considerably improved.

In the discussion which followed Dr. HOLINGER (Chicago) said that the paper was very interesting to him, because he was at present faced with the question whether to operate in such a case. In examining 510 children of the Institute for the Education of the Deaf and Dumb, in Jacksonville, he found a girl of fifteen with absence of both auditory canals. The girl was growing more and more deaf on account of constantly recurring attacks of otitis media. The first attack came on after scarlet fever, and the pus broke through the mastoid. The question of operation answered itself. He should operate in the following way. He should chisel behind the auricle down to the middle-ear, and remove the malleus and incus. He should allow the wound to granulate and then cover, according to Siebenmann, with Thiersch's grafts. Thus he should create a canal behind the ear. The operation would be to improve hearing and to stop the recurrence of the suppuration.

Dr. HARTMANN, closing the discussion on his paper, said: It is not advisable to operate on such cases as long as there is no inflammation. I do not believe that an operation according to Professor Siebenmann will improve the hearing power. If there is recurrent inflammation, as in the case of Dr. Holinger, we may proceed as he advised.

PAPERS.

Dr. T. BOBONE (San Remo) read a paper on *The Early Involution of Adenoid Growths on the Riviera.*

The paper was a contribution to the etiology of adenoid growths. Dr. Bobone said he had for some time been surprised at the fact that adenoids are excessively rare amongst the natives at San Remo. Moreover, he had observed that adenoids, in patients coming to the Riviera and or the removal of which the parents would not consent to

an operation, began to slowly involute; so that some months afterwards nasal respiration was possible, speech was much improved, tendency to cold and cough with very slight provocation was lost, and normal development took place.

Dr. Bobone considers that pure and simple involution of the adenoid growths, although not generally admitted, is possible; and this involution he attributed to the same causes as the rarity of the vegetations amongst the natives. That cause must be looked for in the dryness of the climate and the clearness of the atmosphere on the Riviera.

The other etiologic factors in the causation of adenoid vegetations mentioned by authors, such as geographical latitude, diatheses, discharge from the nose, infectious fevers, etc., are also to be met with at San Remo, and notwithstanding, the adenoid vegetations, as already stated, are so rare.

Dr. Bobone believes the most important factor in the etiology of the vegetations to be the humidity of the climate of the country where they are observed, and that the greater the humidity, the larger the number of children with adenoids. He has been able to demonstrate this fact in observing the geographical distribution of the vegetations in Italy, where the frequency increases with the humidity of the climate of the different regions, as the following table shows:

<i>Names of the Observers and Localities in which they are living.</i>	<i>Frequency with which they find Adenoid Growths.</i>	<i>Relative Humidity of these Localities.</i>
Bobone (San Remo)	extremely rare	60°-65°
Cozzolino (Naples)	0'01 per cent.	65°
Massei (Naples)	0'3-0'5 per cent.	65°
De Rossi (Rome)	0'8 per cent.	65°-70°
Corradi (Verona)	5 per cent.	70°-75°
Poli (Genoa)	7 per cent.	{ moist climate (Weber),
Kruel (Milan)	8 per cent.	
Arslan (Padua)	very frequently	
Ficano (Palermo)	very frequently	70°-73° 80°

Dr. Bobone is also of opinion that a factor which frequently complicates a simple case of vegetation is inflammation—*adenoiditis*. In the localities where the vegetations are most frequently met with, there also are attacks of adenoiditis more frequent, favored by the cold, the fog and

the damp. Whereas on the Riviera the warm and dry climate is not favorable to the development of and frequently recurring attacks of adenoiditis; and when the vegetations are not irritated by inflammation, the involution can proceed.

Dr. Bobone added that in cases in which the parents would not consent to an operation, the good results he obtained he attributed more to the action of the climate than to other remedies.

Dr. ALLEN T. HAIGHT (Chicago) read a paper on *Naso-Pharyngeal Adenoids as a Causative Factor in Ear Diseases.*

Among the most interesting cases, he said, that came before the otologist were those relating to post-nasal vegetations affecting the hearing, and there were few patients to whom more satisfaction could be rendered than to those so affected. Adenoid vegetations seemed not to be restricted to countries, to climates, to sex, to color, or race of man. Naso-pharyngeal vegetations were a hypertrophy of the lymphoid tissue situated in the vault of the pharynx, bounded on either side by the orifice of the Eustachian tube, and presented on its surface several vertical furrows which partially subdivided it. It was his opinion, based on several years' experience in the Illinois Charitable Eye and Ear Infirmary and in private practice, that the main factor in producing both suppurative and non-suppurative inflammatory conditions of the tympanic and Eustachian mucous membranes was the presence of naso-pharyngeal adenoids, or the condition of the post-nares subsequent to their removal or absorption. Adenoid vegetation might produce inflammation of the middle ear (1) by constant irritation, on account of the obstruction to the circulation of the blood by pressure; (2) by blocking the orifice of the Eustachian tube partially or completely; (3) by their injurious effect upon the general economy of the child, and particularly upon the nerves of special sense; (4) by leaving as a sequela a post-nasal catarrh, which sooner or later establishes some form of middle-ear disease. In children who suffered from adenoid vegetations the hearing was generally very sensibly impaired, and it was the com-

mon thing for a child so affected to have questions repeated often and in a louder tone of voice. In many cases the Eustachian tube was completely blocked by dry secretions of the post-nares. He had observed diminution of power of hearing on the side where the adenoid existed. On the opposite side, where the post-nasal space was clear, the hearing was normal. He had seen cases where the hearing was seriously impaired, and the drum membranes normal in appearance, and yet with safety he assumed the faulty hearing to be dependent upon the growths in the naso-pharynx. Mouth-breathing, he believed, had an important otologic bearing on the subject. The mouth-breathing child was usually found shallow through the upper part of the chest, and with very small lung capacity. They frequently met with children affected with adenoids who were not mouth-breathers, and these children were plump, well developed, and of healthy appearance, although they usually had some ear complication. In his examination of twenty-six children for deaf-mutism, he found only four free from post-nasal adenoids; sixteen of those examined showed marked facial deformity from mouth breathing. He coincided with Harrison Allen and Lisson, who had expressed the opinion that there were many children in homes for feeble-minded and idiots all over the world who were affected with this disease, and who by a comparatively trifling operation could possibly be restored to usefulness and their families. It would be obvious to mention every analogous case reported of deaf-mutes who, after the removal of adenoid vegetations, gave evidence of hearing and began to speak some words. The general belief that adenoid vegetations were never present after the thirtieth year was contradicted by Couetoux, of Nantes, who operated upon a man of sixty-five to cure a marked unilateral deafness. Dr. Haight had found vegetations in ages above sixty, and frequently between thirty and forty. They did not differ histologically from adenoids in children. It was not uncommon to observe these formations in the aged who were hard of hearing. Notwithstanding all the writings of the past ten years, he did not think that the pathologic enlargement of the lymphoid tissue of the naso-pharynx had received sufficient attention in the world's text-books. If the symptoms of

these growths were more generally recognized by the family physician, and their removal accomplished, they would not find so many chronic suppurative and non-suppurative inflammations of the middle ear, with the history dating back to an attack of diphtheria, scarlet fever, measles, or other fevers. As to treatment, he should say it was never too early nor was it ever too late. At the first recognition of existing growths the operation should be performed at once. He had found that curetting was the only true basis of treatment. He was not a believer in general anesthetics in children over the age of twelve, as local anesthesia after twelve made such an operation absolutely free from danger; but there were some cases where a general anesthetic must be administered, especially in refractory children and nervous adults. In children it was advisable to anesthetize in a sitting posture, and he preferred bromide of ethyl to any other of the numerous anesthetics.

Professor KNAPP also advocated the use of ethyl. There was absolutely no danger.

Dr. EEMAN (Ghent), Professor GRAZZI, and Dr. GRADENCO also joined in the discussion.

DISCUSSION.

The Indications for Opening the Mastoid in Chronic Suppuration of the Middle Ear.

The discussion was opened by Professor POLITZER, (Vienna), Professor MACEWEN (Glasgow), Dr. LUC, (Paris), and Professor KNAPP (New York.)

OPENING ADDRESS BY PROFESSOR ADAM POLITZER (Vienna).

Professor POLITZER said it was a happy idea of the Organization Committee to have put on the programme a discussion on such an important question. There was no question of otology which had acquired more actual interest than the free opening of the middle-ear spaces for chronic suppuration of the middle ear. Experience had shown that the free opening of the middle-ear spaces was of the most vital importance, by which they were able to save the life of the patient and prevent other consequences to the middle ear hurtful to the organism. The indications

were generally acknowledged, and in most cases with well-marked symptoms the surgeons were likely to be in perfect agreement; therefore there could be but little new to say in reference to the indications. The chief point in that discussion would be to decide whether it was justifiable without well-marked symptoms to operate as frequently as some operators maintained. Professor Politzer then enumerated all the indications for the so-called "radical operation," giving after his own experience a complete critical view on the subject.

In his enumeration, he classified the indications in two groups—objective and subjective.

The objective indications were briefly:

1. Caries of the walls of the tympanum.
2. Granulations and polypi in the neighborhood of the aditus, and recurring after removal.
3. Fistulae opening into the mastoid cavities, and frequently leading to cholesteatoma.
4. Cholesteatoma.
5. Hyperostotic stricture of meatus.
6. Facial paralysis or paresis.
7. Painful swelling on the mastoid (indicating acute mastoiditis, fistula, cholesteatoma or sequestrum).
8. Obstinate long-continued fetid discharge, rebellious under all forms of treatment, especially when the perforation is in the postero-superior quadrant, and the remains of the membrane is adherent to the inner wall, and still more if pus, or especially crumbling masses of epithelium, can be sucked out by means of Siegle's speculum.
9. Symptoms of tuberculosis occurring in the course of chronic suppuration of the middle ear (the supervention of aural suppuration in the course of pulmonary tuberculosis is unfavorable for operation).

Further, high temperature preceded by rigor or oscillation of temperature, indicating sinus phlebitis or direct septic absorption. Also vomiting, with headache, and other brain symptoms, or changes in the fundus of the eye.

The subjective symptoms were:

1. Persistent or recurrent pain in the ear or mastoid process, especially with persistent and fixed pain in the parietal or occipital region, and increased by percussion, which frequently points to temporal or cerebellar abscess.

2. Vertigo, either permanent or intermittent attacks, which may be due to erosion of the external semi-circular canal, or extension of the disease to the interior of the labyrinth (as would be indicated by the usual tuning-fork tests for nerve deafness, and would call for a removal of the labyrinth, as advised by Jansen, over and above the original mastoid operation).

3. Well-marked brain symptoms, such as headache, heaviness, pressure, torpor, loss of consciousness, etc.

Operation was all the more called for if the objective signs were accompanied by any of the serious subjective symptoms, and the symptoms of serious brain complication, instead of being contra-indications, called for immediate operative interference. With regard to meningitis, it was now well recognized that the most pronounced symptoms of that disease might be due to a serous, as distinguished from a purulent form of meningitis, recovery from it being a frequent sequel to the thorough removal of the ear disease. Such symptoms, therefore, would not contra-indicate operation unless lumbar puncture showed the cerebro-spinal fluid to be infected.

Professor Politzer concluded that experience taught him that not rarely the clinical symptoms did not correspond to the pathologic changes found during the operation in the temporal bone. Sometimes only insignificant changes, such as a small quantity of granulation tissue in the attic or antrum, were found in cases where he had performed the operation on account of dangerous symptoms. On the other hand, he found grave changes where before the operation he would not have expected them.

These circumstances rendered it more difficult to draw strict lines in regard to the indications, and there would always be cases, in which some surgeons, on account of the impossibility of predicting exactly the pathologic changes in the temporal bone, would hold that it was not advisable to wait for the appearance of well-marked symptoms, and decide to operate at once, while other surgeons would advocate more conservative methods. That many cases of the chronic suppuration of the middle ear could be healed by vigorous antiseptic treatment, by removing the granulations or cholesteatoma in the tympanic cavity and the attic, by partially removing the wall of the attic, had

been shown by the daily experience of those surgeons who treated such cases by conservative methods. Although he was a strong advocate of the radical operation in suitable cases, he could not agree with those surgeons who performed it often for the mere purpose of the discharge—at least, until strenuous efforts had been made to stop it by other means. He thought that in these cases it was not justifiable to have recourse to an operation which, although not necessarily dangerous in the hands of a skilled operator, was still a serious one, especially when they considered (1) the many important structures in the vicinity which might be injured, (2) the possible permanent impairment of hearing in those who before the operation could hear fairly well, (3) the protracted healing process after the operation, which very often rendered the patient *hors de combat* for many months. It was his firm belief that these views would in course of time receive general assent, when further anatomic researches and more extended clinical observations had cleared up those points about which at present their judgment was still in doubt.

OPENING ADDRESS BY PROFESSOR WILLIAM MACEWEN
(Glasgow).

Professor MACEWEN said: Mr. President and Gentlemen,—I have to thank you for the honor you have conferred upon me by asking me to open a discussion on the indications for opening the mastoid in suppurative otitis media.

Instead of enumerating the individual indications for opening the mastoid, which may be found in more or less detail in most recent otologic works, and which may require to be supplemented or reduced as our experience ripens, it is thought desirable to regard the subject from a broader basis, and one which may be found more generally applicable. The following forms a useful practical rule:

When a pyogenic lesion exists in the middle ear, or in its adnexa, which is either not accessible or which cannot be effectually eradicated through the external ear, the mastoid antrum and cells ought to be opened.

As there are many ways of opening the mastoid, some

more, and many less complete, the observations made in this note cannot be equally applicable to all of them.

Some operators content themselves in "opening the mastoid" by sinking a narrow shaft into the antrum, through which they can inject fluid, and others perform a typical operation irrespective of the pathologic condition revealed.

The author does not follow the classic operations of Kuster, Stacke or Schwartze, but operates by first opening the mastoid at the base of the suprameatal triangle. From that point he follows the pathologic lesions anteriorly into the middle ear, especially exposing and carefully scrutinizing in all cases the attic of the antrum and tympanum, when, if found eroded, these plates are removed, along with the morbid contents of the middle ear. We then pass backwards and downwards, through the mastoid cells toward the sigmoid sinus, following the pyogenic erosions wherever they may lead in that direction, and when necessary exposing the knee of the sigmoid sinus. After opening the mastoid antrum and cells, the further procedure has a purely pathologic basis; if the disease revealed be extensive, so must be the operation. The greater part of this operative procedure is performed by means of the rotary burr, which is the safest instrument for such a purpose. One of the first objects of the operation is to secure the patient against subsequent pyogenic extension to the brain on the one hand, and the cerebellum and sinus on the other; and this may be done with a probable certainty, as far as the two most frequent localities for brain and sigmoid sinus invasion are concerned. It is to such an operation (with its pathologic basis) for "opening the mastoid" that the following remarks apply:

The ablation of the mastoid, while at once eradicating a suppurative process, chiefly located in the mastoid antrum and cells, affords at the same time ready access to the attic and inner wall of the tympanic cavity, and to the auricular extremity of the Eustachian tube. Immediately following the operation, one can initiate the formation of avascular tissue, and thus create an efficient barrier against pyogenic extension to the otherwise most accessible and most vulnerable parts of the brain, the cerebellum and the sigmoid sinus.

In persistent otitis media purulenta, the mastoid operation has at least three advantages over that of the treatment by way of the external auditory meatus; First, by exposing to ocular inspection all the affected area, and by thus enabling the operator to follow and eradicate all the recesses in the bone made by pyogenic invasion. In this way one does not act in the dark, as the whole pathologic field is open to inspection. Secondly, by being able to secure asepsis. Thirdly, by raising an efficient barrier against pyogenic extension, between the most vulnerable parts of the brain and the sinus.

Indications for Opening the Mastoid in Purulent Otitis Media.

1. There are many cases of purulent discharge of the middle ear, of such long standing, and so intractable to all remedies administrable through the external auditory meatus, that most surgeons would agree that in such the mastoid ought to be opened. When the symptoms are obtrusive, the pain severe, the discomfort great, the discharge profuse, and possibly foul-smelling, the patients themselves will probably demand relief, which the otologist will readily grant. It is not, however, to such pronounced cases that special attention is here directed. It is rather to those in which the decision is much more difficult, especially in the presence of very slight discharge, continuous, though apparently subdued by treatment. Many believe that very slight though persistent otorrhea can lead to no untoward result, the patient living a considerable number of years, possibly even a long life, with the discharge never properly away, and yet not sufficient to arrest attention. Its long duration causes the bearer of it to pay little attention to it, and by-and-by it may be disregarded, and even forgotten.

The pyogenic process may, however, proceed inward, giving rise to symptoms often misunderstood or attributed to other causes, and may eventually either prove fatal or, by undermining the constitution, thereby pave the way for the advent of other lesions. Many patients thus affected, though able to pursue their avocations, are yet subject to periods of malaise, with occasional recurrent slight febrile attacks, irritability, and nervous hypersensitiveness, ex-

hibited in unevenness and irascibility of temper, which attacks last from a few days to a week or more, leaving the patient slightly weaker, though relieved from the depression, and fit to enjoy life. These attacks are so frequent, and the patient becomes so used to them, that he comes to regard them as part of his ordinary habit, and often attributes them, with considerable plausibility, and sometimes with point, to colds, chills, biliousness, indigestion, etc.

When they occur, however, in the presence of pyogenic otorrhea of old standing, they may bear a different interpretation, and in the absence of other definitely assignable causes they may be considered as the result of slight absorptions. In some cases the cause and effect are a little more evident, as when patients have pyogenic pulmonary catarrh with organisms in the lung secretion similar to that found in the slight purulent otitis media, and when these pulmonary attacks are mainly coincident with the recrudescence of the otorrhea. In some such slight cases, after every other assignable cause was exhausted, and after treatment in other directions had failed, the mastoid was opened, when, in the midst of eburnation and sclerosis of the bone, marked osseous erosions, containing small quantities of secretion filled with pyogenic organisms, were found, and generally these led more or less directly to the sigmoid sinus, the coats of which bore evidence of long-standing irritation, and through which, no doubt, the pyogenic absorptions had taken place.

After the operation these patients became greatly improved in health, all their old general symptoms having disappeared along with the cessation of the otorrhea.

Cases with a history of an initial period somewhat similar to the above have been seen at a later stage by the author, coming under observation in a moribund condition from pneumonia, due to septic infections from thrombosis of the sigmoid sinus, originating in a purulent otitis media of old standing; the passage between the cells and the sigmoid sinus being in some instances very small and tortuous, and not unlike those apertures seen in the cases with slight symptoms just referred to.

When it is recollected that in many instances the otitis media purulenta is obscure and overlooked, and that the symptoms of the purulent absorption may be of a "ty-

phoid" as well as of a "pulmonary" type, one can easily understand that death may be attributed to pneumonia or to enteric fever.

It is quite true that, with chronic otitis media purulenta, a fatal issue ensues only in a limited number of cases, a proportion, however, perhaps greater than is generally believed, but as one cannot with any data obtainable at present, foretell which of these apparently slightly affected patients are to become the victims of a fatal issue, ordinary prudence dictates its removal even while it is slight.

It cannot be too often recalled that the virulence of the otorrhea cannot be measured by the quantity of the secretion, its odor, or the slightness of its initial symptoms, and that the pyogenic process may proceed insidiously until some slight exciting cause or accidental circumstance precipitates a dangerous or fatal crisis.

2. Another question arises, whether there be lesions in the middle ear, which, though it may be mechanically possible to remove them through the external auditory meatus, could yet be removed with greater safety through the mastoid. This must be answered affirmatively, while the middle ear and its adnexa are in a septic condition, and when by application through the external auditory meatus they cannot be made aseptic prior to the performance of an operation entailing the exposure of a fresh surface to the action of pyogenic organisms and their products. To operate through the external ear under such conditions is to court disaster. By opening the mastoid one can efficiently remove therefrom the suppuration, and can eradicate its cause, after which any operation involving exposure of a fresh surface can be preceded with in safety.

In numerous instances, cases of intracranial pyogenic extension have occurred in immediate sequence to the removal by way of the external auditory meatus of granulation tissue masses—so-called "aural polypi"—which were protruding into the middle ear. Some of these granulation masses protrude through the bone from the dura mater, which they serve to protect, *as long as they remain intact*, but when they are removed a fresh surface with open mouths of vessels is exposed, and absorption through the softened brain membranes is apt to occur.

Besides rendering the operation safe by asepsis, the

opening through the mastoid enables one to demonstrate the exact locality from which these granulation masses spring. This is difficult and sometimes impossible to do, by operating through the external auditory meatus. One must recollect that many of these granulation masses, presenting at the upper and back part of the middle ear, protrude through eroded bone, and that their presence is to be regarded as indicative of a diseased process which has attacked the osseous tissues as well as the soft parts; and therefore to an extent these granulation masses are symptomatic, and by removing them alone the disease is not removed, but only *one* of its indications.

As long as these masses are left *intact*, they may secrete, but they do not readily absorb, as they are destitute of lymphatics, and therefore in the midst of certain pyogenic organisms, not only may the granulation masses be left with safety, but they afford for the tissues from which they spring a definite protection from the invasion of certain pyogenic organisms. They are a provision thrown out by Nature in an attempt at repair.

In the presence of such granulation masses, one does not devise an operation merely for their removal, but for the eradication of the disease which has occasioned them. In removing them one has also to make provision that absorption will not take place through the wounded surface left thereby.

3. In many, if not all, of these persistent pyogenic otorrheas, the osseous tissue is involved, and it is very difficult, by means of treatment through the external auditory meatus, to eradicate the organisms that have housed themselves in the recesses of a minute particle of necrotic bone. In the interior of such harbors of refuge, situated in the mastoid, the pyogenic and other organisms are safe from any antiseptic wave or blast introduced through the external ear, and wait—and they have endless patience, even beyond that of the aurist—until the antiseptic has exhausted its energies, when they again sally forth, in the tide of a catarrhal effusion, disseminating themselves and affecting fresh areas. Erosion often steadily progresses within the mastoid cells, even when the middle ear has been rendered sweet. In such cases the surgeon would be deceived were he forming an opinion on the asepticity of

the mastoid cells from the condition of the discharge issuing through an external ear which he has rendered aseptic by chemicals, as a slight pyogenic discharge issuing through such chemicals would probably be rendered aseptic in transit.

In other parts of the body where a necrotic bone filled with pyogenic organisms is even exposed to view and of easy access, it is the greatest difficulty, and sometimes it is impossible, to entirely destroy these organisms by direct applications of antiseptics of such strengths as the neighboring tissues would withstand without themselves being destroyed. If this be so under such conditions, how much more difficult must it be by way of the external ear to eradicate pyogenic organisms through hidden, narrow, tortuous, and sometimes almost inaccessible passages which are often found in the mastoid process and cells.

4. In recurrent cases of purulent otitis media, one cannot pronounce the patient safe even when the otorrhea ceases—temporarily.

In one such instance, treated through the middle ear on the most approved principles, with great care, by an aurist of undoubted ability and experience, the patient, who had had a slight pyogenic otorrhea, was pronounced cured by the aurist, the discharge having disappeared, and the condition of the middle ear appearing to him in every way satisfactory. Within about three weeks of this time the patient came under my observation, suffering from pronounced symptoms of cerebellar abscess, and was plunged in profound coma, accompanied with great respiratory difficulty. He was operated on, two ounces of pus being removed from the cerebellum, after which he made a rapid recovery. The middle ear contained only a few drops of pus, the mastoid, antrum and cells contained more, and an erosion in the mastoid exposed the sigmoid sinus, which was thickened, the disease having spread to the cerebellum by continuity of tissue. With the data at the disposal of the aurist in this case it would have been difficult for him to have acted otherwise than he did, and had he done so, it would have been at variance with the teaching of the day. This case, however, demonstrates that the information obtainable by inspection of the middle ear is not sufficient to reveal the pyogenic invasion of the recesses of the mastoid region.

Had the case been treated by opening the mastoid in the way described, the formation of the abscess in the cerebellum would have been prevented.

5. Cholesteatoma and tubercular processes with secondary pyogenic involvement are also conditions for which the mastoid requires to be opened, as it is only in this way that these diseases can be efficiently removed.

6. The problems connected with the question of operation upon recurrent attacks of purulent otorrhea are somewhat similar to those which arise in connection with appendicitis. Purulent otitis media and appendicitis have many analogies. They are both pyogenic, but while the latter is the result of the action of a well-known bacillus, whose course is definite, the former may be the result of one or other of a variety of organisms of greater or less virulence, and producing different pathologic effects. Both are apt to invade neighboring structures, the one the peritoneum, the other the intracranial tissues. Both are insidious in their action, and as long as they exist they are apt to undermine the health and reduce the vigor of the individual. Both tend to precipitate a sudden serious illness, and one which is often fatal. In both an early and complete operation not only at once relieves the patient from the depressing effects of the disease, but at once removes the possibility of a sudden and fatal termination. In both many, lulled into a sense of security by the apparent passivity of the disease and its long duration, and arguing from the fact, that as the patients have recovered from one attack they are equally likely to recover from another, postpone operation until the peritoneum in the one case and the brain in the other become involved, and a fatal termination is imminent, and then it may be too late to save the patient.

7. With regard to the fauna occurring in that perfect incubating chamber, the middle ear and its adnexa, and their relative pathologic significance, the time at our disposal prevents us dwelling at present further than to state that valuable indications may be derived from the identification of the particular form or forms of organism which may be present in such cases.

8. After what the author has elsewhere written, he presumes that it may be understood that the opening of the

mastoid must always be undertaken as a preliminary step to operating upon those intracranial lesions originating in purulent otitis media—abscess of the brain or cerebellum and sigmoid sinus thrombosis. To operate upon the several complications, and to leave uneradicated the paths by which pyogenic organisms enter, is to render the patient's recovery doubtful, and to expose him to fresh attacks.

9. Syme is credited with saying that diseases of the ear were of two kinds: the one which is curable, and is treated by the surgeon; the other which is incurable, and is treated by the aurist. Whatever be the special province of the present-day aurist or surgeon, let us hope that we relegate to neither many cases of incurable disease. The anatomy and pathology of the mastoid region were not understood in Syme's day, and the operation of opening the mastoid in its present conception was unknown. As the subject which you, Mr. President, have arranged for this discussion is the indications for opening the mastoid in purulent otitis media, we are precluded from entering into the consideration of the results attending that operation. The personal experience of the author leads him, however, to state that he regards the operation of opening the mastoid as the safest and most efficient way of eradicating otherwise persistent purulent otitis media. In conclusion, he adds that the more the pathology of purulent otitis media is studied, the more frequently the complete ablation of the mastoid recesses is undertaken, the fewer will become the so-called incurable cases of "ear disease." He regards the operation of opening the mastoid as substantially contributing to the well-being of human comfort and happiness, and materially lengthening life.

OPENING ADDRESS BY DR. LUC (Paris).

Dr. LUC said: The indications for opening the mastoid apophysis, which are simple enough in cases of acute suppuration of the ear, because they then consist of the combination of signs characteristic of purulent retention in the antrum and mastoid cells, are, on the other hand, numerous and varied in cases of chronic otorrhea.

Here the phenomena may suddenly appear at a given moment, after months and years of suppuration, nothing having occurred to interfere with the flow, which, causing

the patient no pain, has been more or less neglected by him. But this is only a very limited aspect of the question, and in addition to this primary indication, which was the only one known at the commencement of aural surgery, others have been added. The progress of our methods of diagnosis has taught us that in the majority of cases the intractable nature of many otorrhées results from lesions seated in parts of the middle ear which are inaccessible to our means of treatment through the natural passages—the attic and antrum.

It is thus that we have learnt to open the mastoid, no longer simply to insure the flow of pus retained in the cavities, but to reach the extreme limits of the suppurative focus, and to dry up in a radical way a suppuration which is otherwise incurable. We must recall to mind that Schwartzé of Halle, Zaufal of Prag, and Stacke of Erfurt, have been the principal promotoris of this movement, which has since become so widely known. There is then a second cause of indication quite distinct from the first.

There is a third, since the numerous endeavors to open the cranium, which have been made within recent years, to circumvent the results of intracranial affection so frequent in the course of otorrhea, have led the majority of aural surgeons to the conviction that the antrum is the most certain track by which to reach the original focus, be it meningitis, encephalitis or thrombophlebitis arising from disease of the ear, and consequently this opening must be considered as the prelude or first step preceding the search for any of the foci in question. Our subject is thus divided into three chapters, which we will consider in succession.

1. Indications for Opening the Mastoid in Chronic Otorrhea in Case of Purulent Retention.

It is not our intention to dwell long on this subject. The indications for operation are almost identical with those present in the acute forms of otitic suppuration.

It is aroused by some intercurrent accident, occurring most unexpectedly, in the course of an old otorrhea, until then more or less neglected. Generally brought on by the development of exuberant granulations in the cavum, particularly in the neighborhood of the *aditus ad antrum*, the pus which had always easily flowed out of the attic into

cavum and meatus finds an obstacle to its regular evacuation; the patient feels for the first time an ear-ache, localized generally at the base of the mastoid process. At the same time fever makes its appearance, while the general state is disturbed.

Palpation of the apophysis reveals a marked tenderness to pressure, predominant at or chiefly confined to its base, except where the cells extend almost to its point, this last region proving the chief seat of pain.

When the antrum is contracted, deep and separated from the surface by a broad band of eburnated tissue, retention causes the seat of disease to give rise to a sensation as of an otalgia, more or less intense, generally accompanied by sensibility to pressure at the base of the process, and a persistent febrile state, with the arrest or diminution of discharge. Consequently the persistence and accentuation of this state constitute an indication for intervention, provided it is necessary for a re-establishment of the flow of pus, a procedure such as removal of polypi that obstructed the meatus in such a case, growing, may be, from the cavum in the region of the aditus, not proving sufficient.

Pain, and that alone, gives, in our opinion, a reason to intervene when it has attained a certain degree of intensity, depriving the patient, for instance, of all sleep. Delay operation in such a case, other symptoms appear, such as swelling over the mastoid, edema, and the risk is run of finding signs that infection has entered the cranium.

Intra-mastoid retention of pus is happily not always so obscure in the course of chronic otorrhea. Quite often, in fact, pain and the sensitiveness of the region of the apophysis are not slow in exhibiting the classical local symptoms of mastoiditis, so-called mastoid retention; for it is well recognized to-day that all suppurations of the ear are accompanied by a purulent mastoiditis, and the local signs in question—swelling, edema, and redness of the skin—indicate not simple antral suppuration, but *imprisonment of pus in its interior*.

These signs always notify the natural advance of the pus to the soft external parts, which we consider as favorable and beneficial: favorable in the sense that the mastoid antrum is shown to be superficially placed, and re-

moving at the same time the danger of eruption of pus towards the cranial contents; beneficial in the sense that it clears the mind of all doubt in those doctors most inclined to hesitate or temporize, and causes them to operate without delay.

What must happen in such cases? What must be the nature and extent of our intervention? We believe we can arrive at the principle. Whenever there is an indication to operate on the mastoid in the course of a chronic otorrhea, whether on account of the phenomena of retention, or that one proposes to discover and destroy the lesions maintaining the suppuration, the operation of opening the cavity and subsequent curetting ought to affect the whole of the cavities of the middle ear.

It is of slight importance whether we commence the operation through the antrum to reach the attic, along the aditus, after the method of Zaufal, or whether, following the teaching of Stacke, we enter the antrum *via* the attic. Yet, again, all the cavities, all the recesses of the middle ear, must be opened and cleaned out. Proceed otherwise, and the patient, notably in a case of retention, remains exposed to a persistence of this otorrhea, its reproduction, and finally to those accidents we seek to combat.

2. Indications for opening the Mastoid with a view to the Radical Cure of Chronic Otorrhea.

We believe we may express this principle, that any focus of suppuration, however inveterate it may be, is unable to resist the surgical treatment which realizes the triple result of exposing, then cleaning and draining, the whole of its suppurative surface.

What has for long justified the expression "intractable otorrhea" is that, up till recent times, apart from accidental retention of pus in the mastoid, indicating urgently the opening of the antrum, all treatment of aural suppuration was limited to the opening of the tympanum. This is only a very small part of the cavities of the middle ear. Above it is the lodgment of the ossicles, the attic, which is concealed from our inspection by the osseous ridge, which results from the difference of level between its roof and that of the auditory meatus. Behind it, and on a slightly higher level, is the petrous antrum, communicating with it by a narrow canal, the aditus, and extending more or less

far in the direction of the base of the mastoid process.

The prolongations of the tympanic cavity upwards and backwards, the attic, and the antrum are the most often involved in the pathologic process, and especially in the suppurations. Further, certain peculiarities of the anatomic disposition render them peculiarly favorable for the retention of pus, and the perpetuation of suppuration at their level.

Indeed, both these peculiarities are explained by their situation, which renders them inaccessible through the natural passages both to our inspection and our means of treatment. Let us add, in regard to the petrous antrum, that as it dips more or less deeply into the mastoid process, below the level of the aditus, which is its natural outflow, and passes insensibly in many cases of old-standing osteitis, along with the mastoid cells, into a large suppurating cavity, which extends down to the tip of the process, it can only emit its pus into the tympanum when there is enough to overflow—a circumstance favorable for the development of fungating granulations, which in their turn can keep up the suppuration, and only disappear under the action of the curette. As regards the attic, it would seem at first sight that its situation immediately above the tympanum would favor in the best possible way the outflow of any pus secreted in its interior, but in its origin the mechanism of the retention of the pus is here of a special nature: namely, in the very middle of the cavity in question there is the bulk of the ossicles, which are held in their respective positions by complicated ligamentous apparatus, whose meshes allow the pus to circulate only with the greatest difficulty. We must add to this that the ossicles, which are generally affected by the spread of the fungating osteitis, contribute actively in keeping up the otorrhea.

The preceding considerations had not escaped the surgeons of the Halle school, where we must admit that modern aural surgery, which has become so fruitful in its results, had its birthplace. Schwartze was the first who endeavored to bring about the cure of several otorrhreas by opening the antrum with a view to making a counter-opening for the outflow of lotions injected through the meatus.

On the other hand, one of his pupils, Ludewig, brought

about the cure of other chronic otorrhées by the extraction of the carious malleus and incus. The road was thus opened in the direction of genuinely rational treatment for the most intractable forms of otorrhea; but it remained for Stacke (of Erfurt) to give the complete solution of the problem, by proposing a new operative method of laying open and cleaning by one stroke the whole of the cavities of the middle ear.

Stacke, however, limited his first interventions to the attic, but soon experience taught him that this limited intervention ended most frequently in failure, as the lesions met with in this cavity existed almost always simultaneously in the antrum, and he arrived at this conclusion, to which we have ourselves been led by experience, and which we cannot express too strongly as a principle, that *the mastoid antrum, the actual prolongation of the attic, near the base of the petrous bone, participates in the great majority of cases in the suppurative lesions of the latter, and ought therefore to be opened and curetted at the same time, when sufficiently long attempts at local treatment of the otorrhea through the auditory meatus have failed.*

We are now naturally led to study the combination of signs, which in the course of a chronic otorrhea indicate that the attico-antral cavity participates in the suppuration, if, indeed, it is not the sole or principal source, and that consequently surgical interference is called for, answering the precise object of rendering accessible to the action of the curette and to drainage a region which is naturally beyond our means of treatment, owing to its anatomic situation.

Clinically, chronic otorrhea, originating in the antrum, presents itself under two distinct aspects, according as it is accompanied or not by a fistula. We should consider the symptoms of these two forms successively.

In most cases the mastoid fistula is on the external surface of the process, and as a rule at its base, but it may be further back or near the tip. Under these circumstances there is nothing easier or more instructive than to explore the opening by means of a probe. We are here, so to speak, brought directly in contact with the osseous lesion, and when the instrument has penetrated the antro-mastoid

cavity, it gives us very valuable information as to its situation and dimension.

But the mastoid fistula does not always appear on the external surface. It may occupy other positions, and it is all the more important to recognize them, in proportion, as they are unusual.

Let us mention, in the first place, those not very rare cases in which it is found on the posterior wall of the auditory meatus. We have recently observed during the present year a remarkable example in a diabetic lady, about fifty years of age, who was sent on account of what appeared to be a simple otorrhea. The first peculiarity which arrested our attention was that insufflation of air into the tympanum was not accompanied by perforation sound, and further that the fundus of the meatus was obstructed by a large granulation-mass, growing from the posterior wall. After we had removed this granulation from the wall, we found a fistulous orifice, from which pus escaped in abundance. This led us to suspect an anterior mastoid fistula.

In this case we were unable, on account of the narrowness and obliquity of the osseous fistula, to confirm our diagnosis by means of the probe or exploratory irrigation by means of Hartmann's canula, but the lesions seemed sufficiently characteristic to justify the proposal to open the mastoid cavities, and we had an opportunity, a few days afterwards, of verifying the exactness of our diagnosis. In point of fact, the operation revealed that the process was converted into a vast suppurating cavity, from which the pus could only escape by an overflow through a narrow orifice on its anterior wall.

The diagnosis of chronic mastoiditis, which is difficult when a perforation occupies the position described, is much more so when, subsequent to chronic Bezold's mastoiditis, it is situated on the internal wall of the process, the pus escaping from there, along a deep track underlying the sterno-cleido-mastoid, to escape by an orifice often far away from the mastoid region, so that the first idea in one's mind is that one has to deal with a fistula arising from a cold, cervical, glandular abscess.

We published at the commencement of this year, in the *Archives Internationales d'Otologie*, a remarkable case, and

we believe a unique one, of this clinical form, occurring in a young man of twenty years of age, who had come for the treatment of a cervical orifice in the right side of his neck, immediately behind the posterior margin of the sterno-cleido-mastoid muscle. This fistula had existed for four years, and was all that remained of a diffuse phlegmon of the neck, which had come on after an acute suppuration in the ear. On the first examination, we found that the tympanic membrane was destroyed, and that the ear still suppurated in a slight degree. The co-existence of a cervical fistula along with an old-standing otorrhea put us on the right line for the diagnosis, and our suspicions were confirmed by the exploration of the track by means of a probe pushed upwards, penetrating at first the mass of the sterno-cleido-mastoid, then the interior of the mastoid process. The young man recovered after a long and laborious treatment, which consisted, on the one hand, in the opening and curetting of the whole cavity of the middle ear, and, on the other hand, the opening in all its length of the fistulous track, in such a manner as to transform it into one deep groove; finally, in the resection of the bulk of the mastoid process, so as to reach the granulations which had developed in its interior around the perforations on its inner wall.

It remains now to consider the signs by which one may recognize the second category of cases of chronic mastoiditis, namely, those in which there is no fistulous track to offer more or less direct communication between the mastoid focus and the exterior.

It is in such cases, apart from accidental retention, that the diagnosis offers the maximum of difficulties. It seems to us that the term *latent mastoiditis* is peculiarly applicable to this clinical form.

Inspection and palpation of the mastoid region reveal absolutely no abnormal peculiarity; there is neither fistula nor redness of the skin, nor tenderness on pressure. The whole symptomatic expression of the affection is limited to an intractable otorrhea, in the customary sense of the word, that is to say, resisting the most varying therapeutic means, including the extraction of the ossicles.

What do we learn in such cases from the examination of the tympanic membrane?

We find it always perforated, that goes without saying, but its perforations may be referred to three distinct types, which are easy to classify:

1. There is first the type of *Shrapnell perforation*, situated above the short process of the malleus.
2. Then *circum-malleal perforation*, characterized by extensive destruction of the tympanum all around the handle of the malleus, which hangs in its middle. Often there are fungating granulations in the posterior region of the perforation, that is to say, in the neighborhood of the aditus, which indicate disease in this region, and irrigations in this direction made by means of Hartmann's canula confirm this presumption by bringing about the expulsion of cheezy and fetid pus.
3. Finally, the *postero-superior perforation*, characterized by a small loss of substance in the membrane, situated in the region of the aditus. This perforation, like, the preceding ones, frequently allows of the passage of small polypoid masses, which recur invariably every time they are removed, and irrigation directed towards them by means of Hartmann's canula produces the same result as in the preceding cases.

Independently of these polypoid growths, the different types of perforation which we have just passed in review permit us at times to discover whitish mother-of-pearl masses, which are nothing else but cholesteatomata occupying the attico-antral region. In such cases the Hartmann canula again plays its marvellous role, as a means of diagnosis, by expelling these pathologic products, which are so characteristic, and placing them directly under the eye of the observer.

The different otoscopic confirmations which we have just enumerated would then offer strong presumption in favor of the suppurative focus being in the attico-antral region, especially if in the case of large tympanic perforations the examination of the lower part of the drum revealed no lesion capable of keeping up the suppuration.

Does this diagnosis carry with it at once the indication for opening the mastoid and the attic? We do not think so. In a case which we have supposed of an intractable chronic otorrhea, but unaccompanied by indications of retention, or threatening complication, there is no urgency

for interference. It is then our duty to avoid having recourse to the great surgical opening in question, until we have exhausted the rational local means applicable through the meatus. Among these means we would place in the first line irrigation practiced through the perforation in the direction of the attic and aditus by means of Hartmann's canula, this simple instrument of which we have now to speak strongly in praise as a curative means, just as we have already spoken of it as valuable for diagnostic purposes. In point of fact, these irrigations carried out regularly and followed by the insufflation of various anti-septic powders and by tampons plugged as deeply as possible, bring about a cure with considerable frequency in cases in which one would be tempted at first sight to consider the surgical opening the only possible means of treating them successfully.

If these means, employed methodically and regularly for several weeks, should fail, there is still one method of treatment to which we should have recourse, namely, the extraction of the ossicles through the natural passages, especially when we have to deal with a Shrapnell perforation, or when the ossicles appear manifestly affected with osteitis.

This operation ought to be followed by as complete cutting as possible of the attic by means of little curettes curved in different directions, after which the drum should be plugged with strips of gauze, which we should take care to introduce right up into the superior part.

After several consecutive weeks of this treatment we must be guided by our results. If the suppuration persists, with or without the regrowth of granulations in the region of the aditus, if the injections directed upwards and backwards by means of Hartmann's canula towards the antrum continue to bring about the expulsion of fresh quantities of pus, and particularly if this pus is fetid, laden with cheesy granulations and with necrotic scales, there should be no further hesitation; the extraction of the ossicles has only enabled us to touch a portion of the lesions, and there remains another focus to be opened and cleansed, which could only be done at the cost of an operative breach, necessitating an external wound; from this moment to open surgically the attic mastoid cavities becomes an absolute duty.

Indications for the Opening of the Mastoid in Chronic Otorrhea in Cases of Threatening of Intra-Cranial Complications.

We have just passed in review two classes of cases in which the operation of opening the mastoid was a necessity, but in these the urgency of their nature was quite different: in the first it was a matter of intervening without delay in order to insure the escape of pus supposed to be retained in the mastoid cavities, and at the same time to remove the focus of suppuration by opening it and cleaning it out in its whole extent; in the second class, on the other hand, this latter task was the only one which had to be fulfilled; we were in presence of an otorrhea which had proved its intractable nature under all methods of treatment directed against it through the natural openings, whence the conclusion that the focus keeping up the suppuration was inaccessible by these passages, and that it was necessary to attack it by an artificial route. But, however, there being no urgent call for the intervention, the operator can take his time and only decide to intervene after he is assured of the insufficiency of other methods of treatment.

We have now to consider a third class of cases, in which the urgent call for intervention is still more imperative than in the first; it is not merely a matter of allowing exit for purulent secretion which is prevented from escaping, and thus to put an end to the more or less severe pain, at the same time that one assures the patient against the possible danger of an extension of pus into the intracranial cavity, but it is necessary to combat without delay the real danger of a commencement of meningo-encephalic extension.

Before entering upon this subject there is one symptom, pointing to a well-known complication of chronic suppuration of the middle ear, with which we think we ought to occupy ourselves at this point, more especially in considering the indications for the opening of the mastoid. We refer to the occurrence of facial hemiplegia on the same side as the affected ear. It seems to us that we are all agreed in according to this eventuality, under the circumstances supposed, a very special degree of gravity. It marks, indeed, a further step in the progress of the de-

structive work of the osteitis, and it is not uncommon to see it followed more and more quickly by the explosion of an intracranical infection. In all cases, this occurrence being possibly the result of compression of the nerve, either by a sequestrum or by granulations blocked up in the region of the aditus, it is rationally indicated that we should at once go to the help of the nerve which is thus in danger, so as to be in time to prevent, if possible, a lasting facial paralysis. For all these reasons we ought to consider the occurrence of peripheral facial hemiplegia on the same side as the diseased ear, in the course of chronic otorrhea, if not as an indication sufficiently decisive to determine of itself the necessity for intervention, at all events as an argument of such a nature as to remove all hesitation regarding the necessity for operating without delay, in cases where the collection of signs presented by the patient would seem to render the surgical opening of the ear justifiable.

While there is only relative urgency in case of the occurrence of facial hemiplegia of otic origin in the course of an intractable otorrhea, this urgency to the opening of the mastoid becomes absolute in the presence of any symptomatic manifestation betraying the commencement of intracranial infection with or without concomitant retention of pus, the natural outflow of antral pus through the tympanum and the external meatus preventing in no way the fungating osteitis from carrying on this destructive work, and from exposing at any given moment the external surface of the dura mater to contact with the infectious germs of the aural focus.

We do not consider it our duty here to draw up a complete symptomatic table of intracranial infection arising from the ear, whether we are concerned with the commencement of meningitis, of encephalitis or of thrombophlebitis of the lateral sinus. It is quite evident that when the classical symptomatic combination of symptoms peculiar to one of these complications is produced, the opening of the skull and the search for the intracranial focus must be carried out without delay, as the only possible means of saving the patient.

Now, in such circumstances, even in the presence of certain symptoms called focal symptoms, pointing to the

existence of a focus of encephalitis more or less distant from the petrous bone, our opinion (which we know besides to be that of most of our colleagues in aural surgery) is that instead of basing our choice of site for the cranial opening on considerations of cerebral localization, it is better to proceed straight away to carry out the antromastoid opening, pushing our resection of bone to the extent of laying bare the dura mater of the middle fossa of the skull, if we have reason for suspecting a lesion of the temporo-sphenoidal lobe, whereas we expose the dura mater of the posterior fossa and the lateral sinus if the symptoms observed suggest more probably a lesion of the cerebellum or an infection of the lateral sinus.

We have been supposing a case of confirmed intracranial infection; but before arriving at this, our patients pass often through a certain premonitory phase, the significance of which it is important to recognize, because in proceeding from this moment to the opening of the mastoid, we have a great opportunity for circumventing possibilities of accidents by means of disinfection limited to the osseous focus, or at least of preventing them from passing the barrier formed by the dura mater.

We cannot, therefore, too strongly insist upon the symptomatology of this period when the danger might yet be relieved by a simple operation, not risking the grave consequences attached to any interference beyond the limits of the dura mater.

In the first line of this symptomatic enumeration we would place pain, which is no longer limited to the deep part of the ear and the mastoid region, but diffused towards the forehead or the vertex, and taking on the character of severe headache. Often this is accompanied by a certain degree of photophobia, and the countenance acquires the contracted expression which is so peculiar to the initial stage of meningitis. Other symptoms may be added to these and accentuate their significance, even when there does not yet exist any established meningo-encephalitis, a fact proved by the result of the opening of the mastoid at this period: it may be a vertiginous state, preventing the patient from standing erect, and even accompanied by nausea; there may be bilious vomitings, absolutely analagous to those occurring in confirmed men-

ingitis; there is occasionally a shade of inequality between the two pupils. Lastly, the temperature does not always remain normal at this period, especially if the accidents in question are accompanied by purulent retention, or if there is the commencement of infection of the lateral sinus, in which case the fever may present the extensive oscillations which are so characteristic.

Once more we cannot insist too much on the urgency created in regard to the mastoid operation, not by the simultaneous appearance of all the preceding symptoms, but the occurrence in a decided form of even a single one of them.

Under such circumstances, we would formulate the principle that the osseous opening ought not only, as in all cases of chronic otorrhea, to extend into all the cavities of the middle ear, but it ought to be carried to the denudation of the dura mater. No doubt the operator is often saved this trouble, and in many cases in which a prompt intervention may have been determined upon, the occurrence of several meningitiform manifestations which we have just enumerated, but will find the explanation of the symptoms in question in the discovery of a perforation of one of the deep walls of the attico-antral space, leaving the dura mater bare, in direct contact with the pus of the focus.

The duty of the operator in cases of this kind is to carry out minute disinfection of all the walls of the focus, and especially of the denuded portion of the dura mater; also to leave the surgical wound sufficiently open in order to permit of a subsequent inspection of the osseous cavities which have been operated on; but, on the other hand, our confirmed opinion is that we ought not at the time of this first intervention to open the dura mater, because the simple extra-dural disinfection may suffice, and it suffices often to bring about the complete subsidence of even extremely anxious meningitiform disturbances. Now, those of us who have had any experience with cranial intervention know how different the prognosis after the operation must be according as the dura mater has been opened or not.

It ought only to be opened at a second operation, on which we must, however, decide without hesitation and without delay if after supervision for twenty-four hours

subsequent to the first operation there is a persistence, or, still more, an accentuation of the symptoms of intracranial infection.

If the necessity for the deeper operation occurs, it is remarkably facilitated by the first one, which has had for its result to lay bare the region of the dura mater, behind which may be found the focus we are seeking for, either immediately on the surface of the pia mater, or, it may be, at a slight depth in the cerebral substance.

Under these circumstances, the mastoid opening will form the first rational stage of the intracranial intervention; it will have served to justify its further performance, and to simplify the process of carrying it out.

CONCLUSIONS.

A.

The opening of the mastoid is indicated in the course of chronic otorrhea under three distinct circumstances:

- (1) When the object is to give vent to pus in cases of purulent retention.
- (2) For the circumvention of conditions indicating the threatening or the commencing of intracranial infection of aural origin.
- (3) For the cure of the otorrhea after it has been recognized that this has proved intractable to different methods of local treatment applied through the auditory meatus, including the extraction of the ossicles and the curetting of granulations accessible through this passage.

B.

The operation is only urgent in the two first cases.

C.

In all cases of chronic otorrhea the opening in the bone should extend from the antrum to the attic, or from the attic to the antrum, and be followed by curetting and complete disinfection of the whole of the cavities of the middle ear.

D.

In the case of threatening intracranial complications, the osseous breach ought to extend from the first to the suspected region of the dura mater; this membrane, however, not to be opened until a second operation, after a delay of

armed expectation of as short duration as possible, if the threatening signs in question are seen to persist or still more to increase.

OPENING ADDRESS BY PROFESSOR KNAPP (NEW YORK).

Professor HERMANN KNAPP said we did not only want to be informed that under certain conditions, which his predecessors had so exhaustively and authoritatively dealt with, the mastoid should be opened, but also when, how and where, in particular how extensively, it should be opened, the description of the mere technique or the operation, however, lying outside the question. When acute purulent otitis media was on the border-line of becoming chronic, or had just become chronic, opening of the mastoid was indicated both as a curative and prophylactic measure. The indication for opening the mastoid was strengthened if tuberculosis, diabetes, syphilis, or some other constitutional disease, were present, particularly in the case of children. He thought the frequency of relapses in children was owing to the structural conditions of the infantile mastoid. He mentioned a case which had come under his own observation, to show that the suppuration may leave the tympanic cavity, attic, and antrum, but extend into and beyond the tip of the mastoid. The pus cells in this case travelled through the condensed bones in passages so small that they could not be followed with the naked eye. The indications for operation in advanced cases of destructive subacute chronic mastoiditis were absolute, and in the relapses of suppurative mastoiditis almost absolute. The prognosis in both cases was favorable. He had seen children recover who had a whole mastoid and a good deal of the adjacent temporal bone converted into gelatinous masses, and the dura extensively covered with soft discolored granulations. The best treatment of cases which from the beginning showed a disposition to long duration was to perform first the opening of the mastoid, and conduct the subsequent local and constitutional treatment with the utmost care and perseverance, so as to prevent the affection from becoming chronic. As particular requirements in such cases, he should lay stress on (1) a large, deep, and angular incision of the drum-

head and the adjacent part of the posterior wall of the ear canal as soon as there was bulging, (2) opening the mastoid and thorough removal of all diseased tissue, (3) enlarging the antral canal by cautious scooping, (4) watching the course of recovery, using dry treatment rather than syringing. In chronic suppurative otitis media without symptoms of mastoid involvement that had resisted topical treatment and intratympanic operations, attico-antrectomy was indicated. In many cases it was difficult to determine when this should be done. During past years intratympanic operations had steadily lost ground. Many aural surgeons reported good results from the removal of the ossicles and cleansing the attic in cases of chronic otorrhea with or without cerebral symptoms. But, unfortunately, the good results in most of them had not proved permanent. He alluded to a patient who had long been treated by intratympanic procedures, but received only temporary relief. Such cases had determined him not to lose much time with intratympanic operations, although he would not go so far as an excellent otologist who told him that he had abandoned them altogether.

If the outer wall of the mastoid was perforated, and an abscess or a fistula present, it was indicated to evacuate the abscess and seek the perforation, and, guided by it and the fistula, open the mastoid freely and remove all morbid material. That was better than to let the patient take the uncertain chances of a spontaneous recovery, which was rarely complete and permanent.

If the disease extended beyond the mastoid process, the radical tympano-mastoid operation had to be followed by operations on the affected parts outside the ear.

If in chronic purulent otitis media the anterior wall of the mastoid bulges—which meant a suppuration in the cells adjacent to the posterior wall of the ear canal—a free incision down to the bone was indicated. We should then explore the wall with a probe, or, if the skin was swollen and painful, wait a few days to see whether the mastoid should be opened from the outer surface or from the anterior.

If the pus extended from the ear into the pharynx, forming a retropharyngeal abscess, he would open the mastoid and expose the tympanic cavity and attic clear to the tym-

panic orifice of the tube, and free it as far as possible from pus and disintegrated tissue.

The extension of the disease to the posterior cranial fossa was so important and so frequent that the removal of the posterior wall, in particular that part of it which formed the sulcus of the sigmoid sinus, had been recommended and practiced by some competent aurists in all cases. If the posterior wall showed no flaw on the closest search, and the suppuration was limited, he had left the wall alone; but when the contents of the mastoid had undergone extensive molecular disintegration, he considered the exploratory exposure of the sigmoid sinus and dura mater correct practice. Similar indications resulted from the extension of the suppuration into the middle cranial fossa, an occurrence less frequent than its extension into the posterior fossa.

Extension of the suppuration in the petrous bone might indicate opening of the mastoid as an initial step for removing carious and necrosed portions of the petrous or evacuating pus which had passed from the middle ear through petrous bone into the posterior cranial fossa, producing an epidural abscess on the posterior surface of the petrous bone.

Meningitis in the first stage might be recovered from by opening of the mastoid and posterior and middle cranial fossæ, exposing boldly the posterior surface of the petrous and liberating the pus.

Necrosis of the different portions of the temporal bone indicated the opening of the mastoid in most cases.

It was evident, Professor Kapp said in conclusion, that the opening of the mastoid in its recent development by the combined efforts of general and aural surgeons took rank among the most important operations.

Professor LUCAE (Berlin) then read a paper on *The Radical Operation in Chronic Suppurative Inflammation of the Middle Ear.*

At the outset I cannot sufficiently express my high estimation, he said, of the operation in question as an extraordinary means of cure in chronic suppuration of the middle ear. At times it has been only by means of this operation that I have seen healing brought about in a large number

of cases. The following observations are intended to serve the purpose of diminishing the abuse of the operation as much as possible.

In the University Aural Clinic in Berlin under my direction there have been from April, 1881 (date of the foundation of the stationary clinic) up to August, 1899, 1,935 *operations for the opening of the mastoid process*, of which 852 were for acute and 1,083 for chronic forms of suppuration. At a superficial glance these numbers may appear large even in the chronic cases, but the experienced aurist will agree with me that the number of the chronic cases in which operation had been performed is by no means great in proportion to the acute.

It is obvious that in only a fraction of the chronic cases in which operation was performed was the operation such as is known as the "radical" one (opening of the whole of the cavities of the middle ear), this having only come into general use within recent years.

In order to form a more exact estimate of the frequency of performance of the "radical" operation in the chronic cases, I have calculated the percentage of operations to the total of cases of aural suppuration, and have selected for this purpose the last four years (the years are counted according to the customary prussian "State year" from April to April). This has been done particularly, because during this period the treatment by means of irrigation with formalin lotion has been adopted since 1895. These had a double advantage, because I was able to cure without operation the larger number of cases, or at least to improve them, and further that, if the remedy produced no good result, the indication for operation was all the more distinctly marked.

The following are the numbers arrived at during this period, namely, from April to April in each year:

1. 1895-96 in total, 2,061 middle-ear suppurations;
 648 acute, with 86 operations = 11·72 per cent.
 1,413 chronic, with 116 operations = 8·35 per cent.
2. 1896-97 in total 1,763 middle-ear suppurations:
 528 acute, with 66 operations = 12·5 per cent.
 1,208 chronic, with 85 operations = 7·03 per cent.
3. 1897-98 in total 1,700 middle-ear suppurations:
 581 acute, with 69 operations = 11·87 per cent.
 1,119 chronic, with 69 operations = 6·16 per cent.

4. 1898-99 in total 1,661 middle-ear suppurations:

530 acute, with 61 operations = 11·51 per cent.

1,131 chronic, with 90 operations = 7·95 per cent.

It must be mentioned that the number of new ear cases has by no means diminished, but, on the contrary, from 1895 to 1899 there has been an increase from 6,536 to 6,704. The percentage numbers speak for themselves sufficiently distinctly, and they show that the number of operations in chronic cases as compared with the acute ones is much smaller; in the year 1897 to 1898 they were only about half. Further, it is of interest to notice how small the absolute percentage of operations in chronic cases has been on the whole, and that the acute cases call for relatively few operations.

The statistical comparison of this period of four years of formalin treatment with the previous years would give no certain results, because most of the cases of chronic suppuration in the middle ear have been treated as outpatients, and only a few in the in-patient department, and, as happens unfortunately in every polyclinic, many of them fail to return with any regularity. We have, however, the general impression that the results of the formalin treatment have been better than those of any other. It is particularly in cases running a "cold" course without any threatening symptoms, and where it was only on account of the fetor of the discharge that there was any suspicion of deeper-seated affection that the formalin treatment was most remarkable. The general rule was that when the treatment was carried out carefully several times a day for four or six weeks, and no improvement in the fetor was brought about, the subsequent operation always revealed severe affection of the temporal bone (empyema, caries, cholesteatoma, etc.). Formalin has the double advantage that it is not only a powerful disinfectant, but it is very cheap. The strength of the solution used by me for irrigation is fifteen or twenty drops to one litre of boiled water. I have never observed severe or lasting irritation produced thereby. The only unpleasant effect, especially in frightened children, is that the remedy runs through the Eustachian tube, and produces occasionally transitory pain in the pharynx. This, however, is soon overcome by means of gargling with cold water.

In such cases a weaker solution may be employed, as the effect of the formalin is very powerful.

Gentlemen, as I think in German, I have spoken in my native tongue. But I now only wish to say some words for the British ears not understanding German. I am of the opinion that the opening of the mastoid, or at least of the cavum tympani, is a very important help in the treatment of chronic otorrhea. But also one may get on in plenty of cases by non-operating. I beg to add that instead of being proud of saying, "I have operated on so many patients," one should be prouder of saying, "I have cured so many patients also without operating."

Professor GUYE (Amsterdam) said the mastoid operation was a very great boon to the patient and to humanity in general, as Professor MacEwen had so well said, but, nevertheless, as to finding the indication for mastoid operations only in discharge which did not give rise to dangerous symptoms he could not agree. He was with Professor Lucæ when he said that one should be prouder of having cured cases of chronic suppuration without an operation. He considered that the important thing in a case of chronic otorrhea was to keep the meatus as clean as possible, the using of carb. glyc., and, thirdly, to have great care for the keeping open of the Eustachian tube. His practice was, to patients who could bear the expense of a menthol insufflator, to get them to blow methol into the nose and through the tympanum, after Politzer's method. The operations ought to be reserved for really dangerous cases.

Dr. MOURE (Bordeaux): I am quite of the same opinion as the openers of the discussion, who do not hesitate to open the mastoid whenever a discharge from the ear resists medical treatment, followed or not by the extraction of the ossicles, when this treatment has been properly carried out. It is certain, however, that surgical treatment ought to be limited to some otorrhées, and not practiced in all, as seem to think the partisans of surgical treatment *à outrance*. When a purulent otorrhea is complicated by local pain; when irrigation directed towards the attic washes out cheesy matter, or, still more, mother-of-pearl pellicles; when the otorrhea continues to be fetid, in spite of regular irrigation; when, finally, we see

the granulations recurring, in spite of ablation or cauterization, still more if there are spots of caries towards the superior or posterior parts of the meatus—in all these cases we must not hesitate to interfere surgically. Moreover, it may be said that all those who have had occasion to perform a certain number of operations of this kind have a tendency the more they operate to be more and more ready to operate. They recognize the necessity for operating, as also the efficacy of surgical treatment, which alone affords the means of curing certain otorrhoeas which are intractable under ordinary treatment.

Dr. MCBRIDE (Edinburgh) joined views with Professor Politzer, Professor Lucæ, and Professor Guye in their conservative methods with regard to mastoid operations. Professor Macewen had laid down that a persistent discharge alone from the ear without other symptoms was an indication for mastoid operation. Under certain circumstances it might be so, but by no means generally. The question came to be, What could they promise to their patients from a mastoid operation? In chronic cases they could promise the patient nothing. A certain proportion did not do well after the operation, the discharge remained, and the patient was exactly where he was before. But he agreed with Dr. Knapp that they did not do quite enough operations in acute cases just beginning to become chronic. Here the discharge usually ceased, the membrane healed, and hearing was restored after draining through the mastoid.

Dr. JANSEN (Berlin) was prepared to accept, as his own, the statement of Professor Macewen, that frequently disease of the mastoid process did not show itself by outward signs. The question with regard to operative treatment was easier when, instead of making the diagnosis simply of suppuration of the middle ear, they designated beforehand the region of the middle ear which was affected. Then cases with suppuration in the lower section of the tympanum did not come into the question, but, nevertheless, it was only with great difficulty that they could effect a cure of disease in the large sinus between the fenestra rotunda and the facial. Further, the rare form limited to the attic was also to be excluded from consideration, as it did not require to be exposed through the

mastoid process. On the other hand, the complication of abscess in the tube, which was very rare, called for an opening through the mastoid process. There only remained the conditions localized in the antrum and mastoid process.

It was desirable to differentiate between antrum and mastoid suppuration, because suppuration limited to the antrum was often cured without operation. When the discharge was slight, and always about the same in quantity, there was a great probability of there being uncomplicated antrum suppuration. A more exact description of the symptoms which indicated retention and increased pressure in the antrum and mastoid cells, as Dr. Luc had described, was possible, and it enlarged the circle of cases in which the indication for operation was urgent.

Professor GRADENIGO (Turin) said that, having performed a great number of middle-ear operations by the retro-auricular method in cases of chronic suppurative otitis media, he had come to the conclusion that the indications for the operation, such as had been generally stated in the discussion, were exaggerated. For the purpose of healing simple chronic pathologic conditions of the tympanic cavity, the extraction of the ossicles, or even of the hammer only, and removal through the external auditory canal of the posterior bony wall, were for the most part sufficient. In such cases the retro-auricular method did not give better results, and even exposed the patient to risks of various kinds. It required a long after-treatment, difficult to be carried out, especially in children, and the final result often compromised the success of the best performed operation. Amongst the decided indications for the retro-auricular operation, with the opening of the mastoid, must be considered the cases of cholesteatoma antri, and all cases where symptoms existed pointing to mastoideal pathologic conditions or to intracranial complications. Regarding the technique, he preferred the Zaufal-Stacke method.

Dr. NOYES (New York) said while he fully agreed with the advisability of operative treatment for cases where there was any bone disease, he recommended the dry treatment. There was a class of chronic cases in which

the acute process might have already considerably subsided, for which the treatment by dry powdered boracic acid was most effective.

Professor KÜMMEL (Breslau) said: One class of cases has not been mentioned—hysterical girls; they are able to imitate any kind of symptoms. I want to illustrate this by reporting the case of a girl who has been operated upon for the fifth time, and never anything has been found. The skull has been trephined over and over, until there is a defect of the size of the palm of the hand. Her brain has been punctured in at least twenty places. Still, about every six months she becomes ill with the same symptoms; she reproduces all the appearances of dizziness; she shows facial paralysis by contracting the one side of the face or the other; she has temperature up to 40.2° C., or 104½° F. This girl is quite well now, with her over twenty punctures of the brain and seven or ten narcoses.

Professor EEMAN (Ghent), on the subject of opening the mastoid, said that, speaking generally, he was a very warm advocate for the radical operation, but he thought it was a duty in many cases to try *at first*, and *before* performing a radical operation, *all* the other means which science possesses against chronic otitis purulenta.

He particularly wished to direct attention to the cases in which the extraction of the malleus can be sufficient to effect a complete and lasting recovery. He said that in his clinic the extraction of the malleus had been performed very often, and with splendid results, about 15 per cent. of the cases being entirely cured. Some of these cases came under treatment with conditions which would certainly have led other surgeons to an immediate and radical mastoid operation, such as fever, intracranial symptoms, inflammation and narrowing of the external auditory canal, etc. In these cases, under appropriate treatment, inflammation subsided in a few days, and then it was possible to ascertain that there was perforation of the membrane of Shrapnell, and caries of the head of the malleus. Extraction of this ossicle gave a perfect cure; some of the cases had continued under his observation for years after the operation, and he was able to state that the results had been lasting. Professor Eeman desired to warmly advocate the extraction of the malleus in cases of

chronic purulent otitis presenting perforation of Shrapnell's membrane and caries of part of the malleus, and the postponement of the radical operation until it has been practically demonstrated that the removal of the malleus was insufficient to cure the patient.

Moreover, he said that he could not agree with the assertion of Schwartz, that isolated caries of the malleus was rare, and that as a rule both incus and malleus were affected at the same time; in his clinic isolated caries of the malleus had been found to be frequent.

Dr. OSCAR BRIEGER (Breslau) expressed himself as follows: Among the indications for radical operation we have included the failure of local medical treatment to produce a cure. According to the present standard of our knowledge this indication will have to be admitted to some degree. But it would be erroneous to deduce that the operation would render subsequent treatment superfluous. On the contrary, after the operative opening of the cavities of the middle ear, the alterations of the mucous membrane, which may become manifest, besides the morbid foci in the bone, may require further local treatment. It is occasionally possible to shorten the after-treatment by combining it with local treatment of the mucous membrane. It is, for instance, advisable in processes which reveal lasting maceration of new-formed or implanted epidermis to plug with gauze soaked in alcohol. Formalin also answers those purposes, as well as combinations with other drugs—for instance, weak solution of nitrate of silver in alcohol—according to the intensity of the process in question.

Luc recommends especially the evacuation of the cavities of the middle ear. If it is to be understood by this that after each radical operation the ossicles ought to be removed, it must be objected that in the interest of the function the preservation of these has been advised. In general this advice is superfluous, because the connection of the columella is in those cases interrupted by destruction of the long process of the incus. It is quite true that the function is sometimes remarkably good after this, in general, complicated method. But it happens that even after complete skinning over of the cavities of the middle ear fetid secretion continuous from carious points of the

remaining malleus. And this is less accessible for treatment, and more dangerous, because the local conditions are altered to a variable extent by adhesions, etc. It is necessary, at least, to make a careful selection of those cases where the ossicles are to be preserved. With regard to the contra-indications against the operation, Dr. Brieger is inclined to exclude meningitis. There are cases where marked symptoms of meningitis are present, and nevertheless there is only circumscribed suppuration, which may heal if new infection from the cavities of the middle ear is excluded by means of an operation; but recovery may take place in spite of diffuse meningitis, as ascertained by lumbar puncture, if the primary centre of infection is destroyed by radical operation, and if by this puncture more favorable conditions are created, recovery may in those cases be effected by removal of the infected material, by the lumbar tapping, or perhaps at the same time by the production of the new transudating lymph, which may have some bactericidal propensity. Of course successes of this kind are rare in extensive meningitis, but are sufficient to justify us in rejecting extensive meningitis as an absolute contra-indication against radical operation, the more so as the operation itself is harmless in those desperate cases.

Dr. BARR (Glasgow) regretted that the subject of their discussion excluded the methods of operation, and the results of operations, especially the latter, because he thought that one of the most important considerations with regard to the subject was the results of operative measures in chronic suppuration of the middle ear. Probably the most interesting class of cases was that for which there was no immediate demand for operation—cases where there were no objective or subjective symptoms demanding speedy operation. They were indebted to Professor Macewen for uttering a warning about continuing the treatment by the external meatus too long before adopting operation. They must not, however, be too much discouraged by certain dangers of ordinary treatment referred to by Professor Macewen, such as the removal of granulation tissue or polypi, as the experience of otologists showed that these were not great. Still, it was well that a surgeon of Professor Macewen's vast ex-

perience should utter those words of warning. Although the question of attic treatment had been rather disparagingly referred to by Dr. Knapp, Dr. Barr believed that the attic syringe was of great value, although many of the attic syringes in use were too narrow in the bore. He had found that in many cases after the attic treatment, including the removal of the malleus and incus, and the efficient use of a proper attic syringe, no radical mastoid operation was required.

Professor FARACI (Palermo) thanked Professor Grade-nigo for approving of his osteotomy forceps. In the majority of cases he had found the removal of the larger ossicles and the resection of the outer wall of the attic and antrum sufficient. He thought it non-justifiable to open the mastoid as a whole till the ossicles had been removed through the meatus. As regards endocranial threatenings, there were two categories: (1) If the complication had occurred, the mastoid was a small part of the whole operation. (2) If the complication was only threatening, the operation through the meatus sufficed, as in a case quoted with meningitis symptoms.

His conclusions were that the mastoid should be opened:

1. When it was invaded by the morbid process in whole or in part.
2. When all the other methods of treatment, including the ablation of the larger ossicles and the resection of the outer wall of the tympanic attic and mastoid antrum, had been found fruitless.
3. In cases of manifest intracranial complications, the mastoid operation being followed by the further interference the complications demanded.

Dr. SUAREZ DE MENDOZA (Paris) thought that pain alone was not necessarily an indication for opening up the cavities of the middle ear in their totality. Sometimes in such cases the mastoid was found almost or quite healthy, and the pain was due to eburnation of the mastoid cells. A simple gouging of the mastoid or its erosion by means of an electric burr might be sufficient in such cases. With pain as the sole indication, they might cease operating deeper if the condensation of the bone and the absence of pus or granulations allowed them to attribute the pain to the condensation of the osseous tissue.

Dr. MILLIGAN (Manchester) said that in cases where local treatment had been faithfully tried for a period of twelve months, and where suppuration persisted, he was in favor of performing a mastoid operation. By local treatment he included the ordinary methods of antiseptically cleansing the parts, the removal of granulation tissue, the removal of diseased ossicles, etc.

Where such methods failed he thought recourse to an exploratory operation justifiable. By its means the paths of infection could be followed up, concealed foci of sepsis could be attended to, and extension to more deeply seated parts frequently arrested.

He desired to associate himself very largely with the opinions expressed by Professor Macewen.

Mr. T. MARK HOVELL (London) said that the mere fact that a discharge had existed for a long time was not a sufficient reason for the mastoid process being immediately opened up. He considered that the operation should not be undertaken in chronic suppurative inflammation of the middle ear until the ordinary methods of treatment had been fairly tried. About ten years ago he saw a lady who had a discharge from one ear which had lasted for forty-three years. It ceased entirely after about six weeks' treatment by the usual method with an antiseptic lotion and dry boracic powder. The discharge had not returned.

Mr. Hovell was of opinion that when the attic was cleared out the mastoid antrum should be opened up at the same time, otherwise a second operation might become necessary.

Dr. C. R. HOLMES (Cincinnati) said he had practiced, and was likely to continue to practice, the lines laid down by Professor Macewen. Dr. McBride had said that they could not promise results to mastoid cases. He certainly wished to put himself against that statement. He believed that in almost every case they could promise the patient a cure. They should save the patient the possibility of two operations when they knew one thoroughly performed would cure.

Dr. DENCH (New York) said each case must be treated according to the local conditions present. When the mastoid operation was involved a complete mastoid operation

was imperative. If during the operation the surgeon found that infection of the lateral sinus had taken place, he must not hesitate to remove every source of infection. In one of the speaker's cases a second operation was necessary, owing to jugular involvement.

Mr. CRESSWELL BABER (Brighton) thought that most were agreed that in chronic suppuration of the middle ear, accompanied by mastoid symptoms, the bone should be opened. The interesting point to consider was whether the mastoid should be opened in cases of chronic suppurative otitis media without any symptoms except the discharge. In those cases he considered that, as a general rule, first of all, every means of arresting the discharge through the meatus (such as careful cleansing, curetting, removal of ossicles, etc.) should be tried, and if the purulent discharge from the tympanum still continued, the risks of pyogenic infection from this focus should be put before the patient or his friends, and the possibilities of an operation on the mastoid placing him in a safer position explained, although, of course, no certainty of a cure could be promised until the parts had been exposed by operation, and the full extent of the disease ascertained.

Dr. RUDLOFF (Wiesbaden) read a paper *On the Operation for the Removal of Adenoid Growths with the Head hanging over the Table, while the Patient is under the Influence of Chloroform.*

In his opening remarks, Dr. RUDLOFF drew attention to the method of performing operations on the hanging head, in cases in which there is danger of blood-suction. He then described his method, of which he had made use during the last eleven years. His experience included over 700 cases. He advocated the free administration of chloroform, and employed Boecker's and Hartmann's curette in performing the operation. In describing the method of operating he drew attention to the following points:

1. Adenoid growths occasionally have their origin in Rosenmüller's fossa. In removing them it is important (a) to avoid injury to the pharyngeal orifice of the Eustachian tube; (b) to bear in mind that the tissue surrounding the carotid artery extends into the lateral wall of the fossa, and that danger of injury to this artery is to be guarded

against. How necessary this warning is is proved by the case recorded by Schmiegelow.

2. Adenoid growths must be thoroughly removed (*a*) in order to avert as far as possible the danger of recurrence; (*b*) because a certain percentage of the cases which occur are tuberculous.

3. If the tonsils are enlarged it is advisable to remove them some time previously.

Dr. Rudloff illustrated his method by means of a specimen (sagittal section through the head), and exhibited the instruments he employed. He further showed casts illustrating the varying dimensions of Rosenmüller's fossa, and the relation existing between this fossa and the orifice of the Eustachian tube, and referred to a specimen showing the relation between the carotid artery and the lateral wall of Rosenmüller's fossa, which was exhibited in the Congress Museum. His statistics recorded a recurrence of $3\frac{1}{2}$ per cent. In concluding, he remarked that he did not necessarily confine himself to the method he had described, but adapted it to the individual requirements of the cases which came under his care.

Professor V. UCHERMANN (Christiania) read a paper on *Rheumatic Diseases of the Ear*.

Mr. President and Gentlemen—Rheumatic diseases of the ear are but little known and seem to be rare. The symptoms are apparently not sufficiently distinct, nor the etiology so clear as to establish a safe conclusion with regard to cause and effect. Still, I am of opinion that a closer investigation of the matter will enable us to recognize certain common features, symptomatic and pathologic, by which a clinical diagnosis of the special cases can be made or rectified. To attempt this, and at the same time to draw the attention of my colleagues to an interesting group of ear diseases as yet little known, is the aim of this paper. At the outset we are met with the old difficulty, What is rheumatism? The answer from an etiologic point of view appears to be more unsatisfactory than ever. Infection admitted, is it a specific infectious disease, or is it only a kind of pyemia dependent upon one or more pyogenic bacteria? Whatever the case may be, we have the clinical picture, which cannot be dis-

pensed with. As we are well aware, the characteristics of the disease are—its tendency to attack the connective tissue (fibrous or muscular) and the endothelial-lined cavities, and to form fibrinous exudates and infiltrates. In this way it appears in the joints, muscles, heart, skin, etc. In addition to this there is its painfulness in certain localities, also its being acted upon by salicylic acid in acute forms, by atmospheric changes in chronic forms. It is necessary to set aside all cases whose only claim to being rheumatic is that they appear to have arisen after a rheuma—that is, a cold or catarrh. To this class belong, for instance, many of the so-called rheumatic cases mentioned by Gradenigo in his labyrinth diseases (Schwartzé's Handbook). It is also necessary to differentiate between acute and chronic forms. Among the former the best known are the polyarthritis acuta (rheumatic fever), acute muscular rheumatism and erythema nodosum; among the latter, the chronic rheumatic muscular and joint diseases. All the rheumatic ear affections that have up to the present been described belong to the acute forms of rheumatism appearing as complications of rheumatic fever. Ménière (*Revue Mens. d' Otologie et Laryngologie*, November, 1883) mentions a case where otalgia, in the form of severe intermittent pain, preceded by four days the attack of ordinary acute polyarthritis. A similar case is given by Wolff (*Verhandl. der Otiatrischen Section der Wiesbadener Naturforscher Versammelung*, 1887), who also adds that the joints of the ossicles can be affected. The clinical or pathologic proof, however, is not given. In both cases the appearance of the drum does not seem to have been altered. Moos has observed a case of apoplectiform (Ménière) deafness during the period of convalescence after acute rheumatic fever, complicated with endocarditis (perhaps embolic). In a second case various cerebral hyperesthetic symptoms appeared with attacks of pain and hyperacusis in the eighth and ninth weeks, hardness of hearing ending in total deafness (Schwartzé's Handbook, tome i., p. 544). Among the deaf-mutes in Norway is a case where an examination of the ear points to the existence of a combined middle-ear labyrinth affection caused by this disease (Uchermann, "The Deaf-Mutes in Norway," vol. i., p. 446).

I have seen two cases where ear affection preceded ordinary rheumatic fever. Both cases were of adults; one a lady twenty-five years of age, who had had rheumatic fever several times before, the other a gentleman of thirty-five, of very rheumatic disposition. In both cases there was an acute inflammation of the middle ear, with marked injection of the drum, abundant secretion of serous or sero-fibrinous fluid, together with quite an unusual amount of pain, both spontaneous and when touched, which continued even after the opening of the drum. In the case of the lady, during the fourteen days before the beginning of the fever, an infiltrate formed on the posterior wall of the bony meatus, involving the adjacent part of the drum, of the size of half a pea, red and very sensitive. In the man's case there was a swelling of the posterior part of the drum, also a more diffuse swelling and sensitiveness of the septum cartilagineum nasi on the same side, with superficial (catarrhal) erosions. In both cases the ear affections healed after eight days with the beginning of rheumatic fever, possibly the result of paracentesis and salicylic acid, though the swelling of the septum did not disappear for several months, and caused considerable impediment to the nasal respiration.

But there are also other cases where the rheumatism from which the ear affection arises is of a chronic character, and where the ear disease itself runs a course less acute and violent, but sometimes for the organ itself more fatal. In the case of a young man about thirty, with a marked rheumatic history, I have seen without any apparent cause, and alternating with rheumatic affections of the throat, a bilateral, so called, otitis media serosa, that is, a collection of serous or sero-fibrinous yellowish fluid in the tympanic cavity, with the slightest inflammatory signs. The case ran a slow course, but finally yielded to repeated incisions of the drum. I venture the hypothesis that many of the cases of serous middle ear affections, especially those marked by yellowish or amber-colored exudate, are rheumatic in origin or foundation, and that treatment with salicylic acid should be tried before any surgical intervention is resorted to. In another case, that of a young, plethoric man, about thirty-four, the symptoms when I first saw him (February, 1895) were the fol-

lowing: he complained that for a year he had suffered from tinnitus aurium and deafness of progressive character, which latterly had greatly increased. He experienced no dizziness, and hitherto he had enjoyed good hearing and freedom from ear-troubles. Occasionally he had felt rheumatic pains, but otherwise had never had a disease of any consequence. On examination the right drum revealed a small round cicatrix (as big as a shot); in the upper and hindermost quadrant there was a little dullness, but no retraction, the left drum being also dull and not retracted. Both the drums were movable by Delstanche. By auscultation the left ostium tubæ Eustachii was found narrower than the right, otherwise nothing was abnormal. From the left ear the hearing of speech was gone. He could neither hear No. 64 of Appun's set of tuning-forks (64 double vibrations in a second) nor Galton's whistle. Rinne was —5", Schwabach much shortened (—). On the right ear Rinne was +5", Schwabach was —. The deeper tuning-forks were heard more distinctly than the higher, the Galton not at all. On this side he heard words spoken in a loud voice at a distance of from 3 to 4 inches. In spite of internal treatment with salicylic acid and iodid of potassium, together with local treatment (leeches, injections of iodid of potassium and pilocarpin, massage (Lucae, Delstanche)—after a couple of months he was completely deaf. At his repeated request at last I tried a stapedectomy on the left ear. On probing, the stapes at first gave the impression of immobility, but by traction became loosened, and then was immediately replaced. The only result was considerable giddiness for a month, during which time he had to lie quite still on his back. At the same time he had rheumatic pains in the right shoulder. About a year later there appeared a reddish, fluctuating swelling of the left eyebrow and upper eyelid, with its seat in the periosteal tissue. By incision I removed about a teaspoonful of sero-fibrinous fluid, upon which the swelling disappeared. A year after, however, it reappeared in nearly the same place, and yielded to the same treatment. On this occasion there was also a swelling over the left *tuberositas frontalis*. Last year he called on me for a nose affection. There was a dry catarrh of the anterior part, with a for-

mation of crusts and a dry perforation of the cartilaginous septum of considerable size. It had developed since the last time I had seen him, and proved very stubborn under the ordinary treatment. In connection with this case I might mention two similar affections of the nose that have come under my notice; one the case of an elderly man, very rheumatic, who eventually died of rheumatism (articular, etc.), owing to general exhaustion. The other a case now under my treatment, where there is no perforation, but the pale, swollen mucous membrane is specked with white fibrous (sclerotic) spots.

It is then a case of what is commonly called secondary sclerosis, with involvement of both the labyrinthine bony capsule and the nervous elements. The history of the case and its accompanying symptoms make it fairly certain that it is of rheumatic nature, and, like the affections elsewhere, bound to the connective tissue. For instance, a swelling of the lining of the canaliculi for the N. cochlearis and the lining of the vestibulum, with the result of more or less fixation of the stapes, will easily account for the acoustic phenomena. While with regard to the bone (labyrinth capsule) the result may be an eburnation (though with the preservation of the greater cavities—vestibulum, scalæ, etc.), or may be, in some cases, the apparent reverse, a rarefaction ("spongiosierung," Siebenmann). To sum up:

1. Rheumatic fever is sometimes preceded, sometimes accompanied, by otalgia, alone or together with an acute swelling and injection of the drum and the adjacent bony meatus, followed by a serous or sero-fibrinous secretion of the middle ear (otalgia, myringitis, otitis externa, otitis media *rheumatica*), or it may be complicated during its progress with affections of the middle ear and the internal ear (labyrinth, perhaps the auditory nerve).

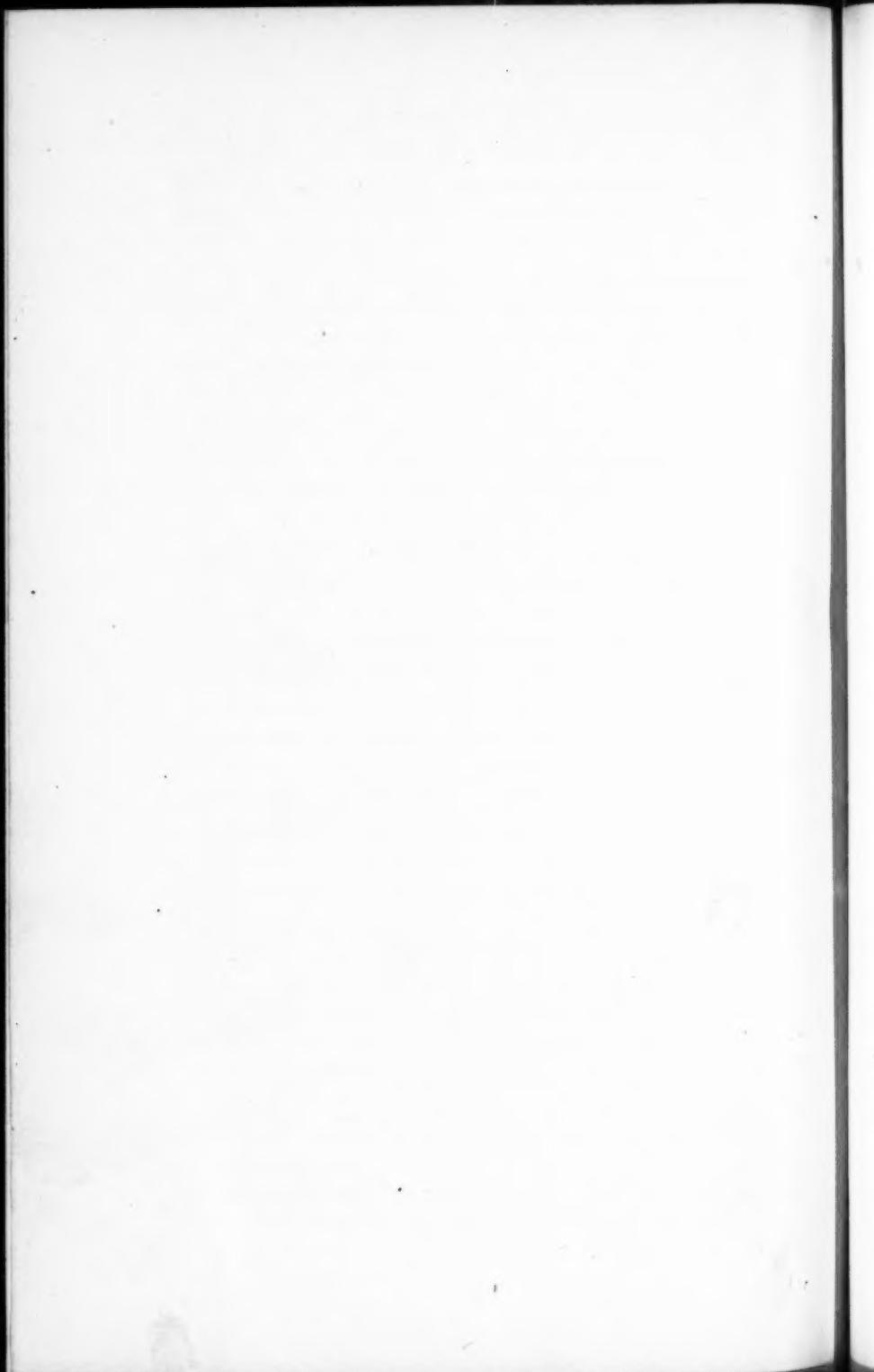
2. There are other more independent rheumatic ear diseases with persons of a rheumatic constitution or tendency (previous rheumatic fever, etc.). The ear affection appears as an otitis media serosa with yellowish, half-fibrinous exudate, or as a (secondary) sclerosis with progressive character.

3. The characteristics of the different forms are: In the acute forms—painfulness, excessive injection, and the

tendency to the formation of fibrinous exudates. In the *chronic* forms—the tendency to the formation of fibrinous exudates, and the tendency to affect the bony capsule, with severe tinnitus and slow but steady progression. Salicylic acid seems to influence the acute forms but not the chronic. These latter, judging from the experience of a case at present under my treatment, are perhaps more influenced by a general rheumatic treatment.

In the discussion which followed Dr. HARTMANN said: The paper of Dr. Uchermann reminds me of one patient who probably comes in this line. A man slept one very cold and wet night in the woods; when he awoke he found he had completely lost his hearing.

Dr. UCHERMANN, closing the discussion, said: It is possible that Dr. Hartmann's case comes in this line, but we will have to differentiate between acute catarrhal inflammation of the ear and rheumatic inflammation of the middle ear. One is easily accessible to treatment with salicylic acid, the other is not. Furthermore, in rheumatic cases we always find other manifestations of rheumatism; exceptionally, rheumatic otitis shows infiltration and exudation in the ear alone.



APPENDIX.

iii

WM. A. FISHER, M. D.,
PRESIDENT.

JOHN R. HOFFMAN, M. D.,
SECRETARY

THE CHICAGO EYE, EAR, NOSE AND THROAT COLLEGE.

A CLINICAL SCHOOL FOR PRACTITIONERS OF MEDICINE.

Equipment Unexcelled. Abundant Material. Courses one month in duration. Practitioners may enter at any time. Equal advantages the year around. Write for catalogue and information to

JOHN R. HOFFMAN, SECRETARY.
Trude Building, 67 Wabash Avenue, Chicago.

A distinguished corps of American and Foreign Contributors

THE OPHTHALMIC RECORD.

A Monthly Journal of Ophthalmology

Represented in the United States, Canada and Europe.

Its subscribers and readers are the cream of the profession.

Subscription \$3.00 a year in advance. Abroad, 14 Shillings.

We will furnish to new subscribers the *Ophthalmic Record* and the *Annals of Ophthalmology* for \$6.00; and the *Ophthalmic Record* and the *Annals of Ophthalmology* and the *Annals of Otology, Rhinology and Laryngology*, for \$7.00 a year in advance.

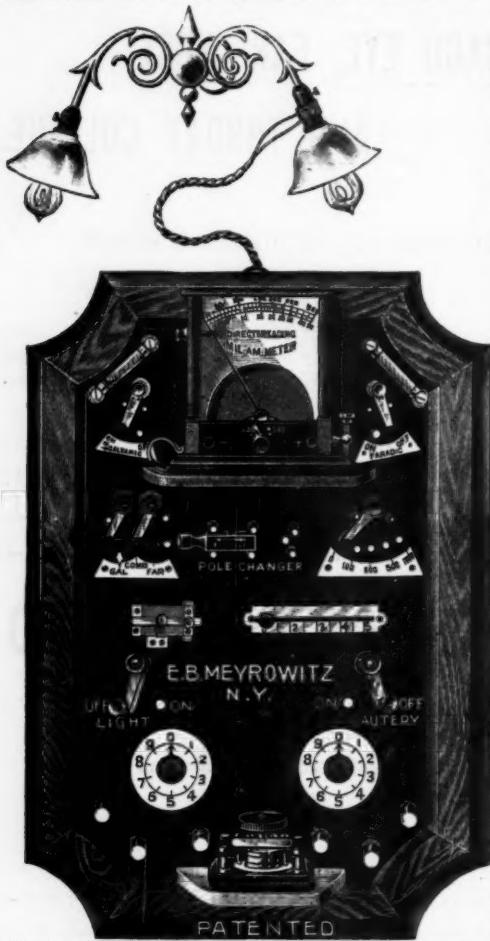
ADDRESS. THE OPHTHALMIC RECORD,

Suite 3, The High Building, Chicago, Ill.

A NEW ELECTRO-MEDICAL APPARATUS

Vetter Complete Electro-Therapeutic Outfit No. 13.

This outfit is designed for galvanic and faradic treatment, for cautery work and diagnostic illumination in connection with the constant 110 volt electric current. The galvanic current, which is limited to $\frac{1}{2}$ ampere is regulated by the Carbon Current Controller, and indicated to a fraction of a milliamperes on the Mil-Ammeter.



Send for new illustrated catalogue of up-to-date Batteries and Electro-Medical Apparatus.

E.B. Meyrowitz

Maker of Electro-Medical Apparatus, and High Grade Eye, Ear, Nose and Throat Instruments.
604 Nicollet Ave., Minneapolis. 104 East 23d St., New York.
360 St. Peter St., St. Paul. 125 West 42d St.,

The Secondary of the Faradic Coil can be tapped at four different lengths of wire increased by the sliding Helix and modulated to the Carbon Current Controller. Both the Galvanic and Faradic Currents can be applied simultaneously by the use of the De Watteville Switch.

All sizes of diagnostics lamps can be operated by the light controller, and through the cautery controller all electrodes as well as the Platinum snare can be heated to any desired point.

A Flexible Shaft and Hand piece attached to the Motor Generator furnishes the means for Surgical Drilling.

BETA-EUCAINE.**An Absolutely Non-Irritating Local Anesthetic.**

Eucaine Hydrochlorate "B" is a white, neutral, crystalline powder, and is soluble in 30 parts of water. It is five times less toxic than cocaine; its solutions do not decompose when kept and can be sterilized by boiling without deterioration. It produces neither corneal disturbances, nor mydriasis, has no action upon the intra-ocular tension, and does not affect accommodation. Beta-Eucaine has been employed by Professors Schweigger and P. Silex, at the University Eye Clinic at Berlin, in a large number of cataract and strabismus operations, etc., with perfect satisfaction. Prof. Bergmeister, of Vienna, Prof. Howe, of Buffalo, and many others, have used Beta-Eucaine solutions with great success in ophthalmic surgery. In rhino-laryngology and otology it has been highly recommended by Dr. F. T. Rogers, of Providence, Drs. Lewis S. Somers, and Laurence Turnbull, of Philadelphia, S. C. Delap, of Kansas City, and others.

XEROFORM.**The Ideal Substitute for Iodoform.**

Xeroform or Tribromphenol-Bismuth is an antiseptic, desiccating and deodorizing agent, which is odorless, non-poisonous and non-irritating, free from germs, with very powerful antibacterial properties, and capable of being sterilized by simple heating to a temperature of 120° C. (248° F.). Xeroform is sedative, haemostatic and analgesic; it promotes granulation and cicatrization more quickly than any other remedy and diminishes pathological secretion with great rapidity. In ophthalmology it has been employed in conjunctival affections, eczema palpebrarum, traumatic and infected corneal wounds, follicular and pustular keratitis, ulcer cornæ, trachoma, keratomalacia and gonorrhœal ophthalmia, with very satisfactory results. Professor Wicherkiewicz, of Cracow, considers it a convenient and useful application and not obnoxious to the patient. Dr. Marcinowski, of Siegmar, likes Xeroform best of all iodoform substitutes. Dr. Friedland, Assistant at the Second Ophthalmological Clinic of the University of Vienna, considers it fully equal to iodoform in value, and preferable on account of its odorlessness.

It has also been successfully used as an insufflation in diseases of the nose and ear by Dr. Lewis S. Somers, of Philadelphia, Dr. F. Hanszel, of Vienna, and others.

Schering's Formalin, Formalin Sterilizer, Formalin Lamp and Formalin Disinfector.

Von Heyden's Citrate and Lactate of Silver (Credé's) and Unguentum Credé. Guaiacol liquid, Pharm. Germ. III Creosotal (creosote carbonate) and Duotal (guaiacol carbonate).

Literature on application.

**SCHERING & GLATZ, 58 MAIDEN LANE, NEW YORK, N. Y.
SOLE AGENTS FOR THE UNITED STATES.**

THE ROBINSON IMPROVED FOLDING VAPOR BATH CABINET

is recommended by the best physicians for RHEUMATISM, NEURALGIA, LAGRIPPE, COLDS, LIVER, SKIN, OBESITY, KIDNEY TROUBLES. Gives BEAUTIFUL COMPLEXION, soothes the nerves, prevents sickness.

This is the only PRACTICAL cabinet made. It is a perfect cabinet; made of best rubber drill; folds into six inches space like a screen; has a door and is ready for use instantly. Is the ONLY CABINET on the market that can be HEATED UP before entering and used as a COOLING ROOM after bath. All other so-called cabinets that are advertised pull on and off the head, making them not only impractical, but dangerous to use.



SEND US ONE DOLLAR

and we will send you any style cabinet by express C. O. D., and then you can examine the cabinet at Express Office, and if found as represented pay agent the balance due.

PRICES: \$5.00, \$6.00, \$7.50, and \$12.50.

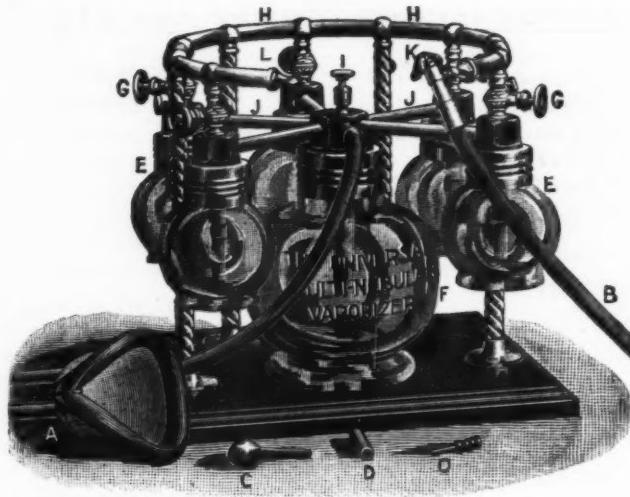
Price depends on quality of goods and finish.

Special Inducements to good agents. In towns where Cabinet is not introduced.

Send for our interesting book "HEALTH & BEAUTY" free.

Robinson Thermal Bath Co., 714 E. Jefferson St., Toledo, O.

THE UNIVERSAL
MUTI-NEBULAR VAPORIZER



For Office Use
 In the Treatment of All Diseases of the
Respiratory Organs and Middle Ear

By Ten Different Methods,

Including

VAPO-PULMONARY MASSAGE

—AND—

..VAPO-AURAL MASSAGE..

The result of long experience, both in the use and manufacture
 of apparatus of this nature.

Write for Illustrated Circular, describing the instrument, and
 methods of use.

THE GLOBE MANUFACTURING CO.,
 BATTLE CREEK, MIC

LISTERINE

IN DISEASES OF THE EYE AND EAR.

The same satisfactory results following the use of LISTERINE in all sub-acute and chronic inflammations of mucous membranes (whether urethral, vaginal, nasal or pharyngeal), is attained by its judicious employment upon the more sensitive surfaces of the eye and ear.

If the period of active pus formation has continued for two days

PURULENT or more, the undiluted LISTERINE may be dropped into the eye every four hours. In **CONJUNCTIVITIS.** those forms observed in infants showing a tendency to the formation of pseudo-membrane, LISTERINE is specially valuable, and of great service in all cases of muco-purulent or purulent conjunctivitis, preceded by the cleansing of the membrane with a solution of chloride of sodium.

A weak solution of LISTERINE affords a great relief from the **GRANULAR** heated, burning sensation.

EYE-LIDS. The scaly, sandy exfoliation of the margins of the lids, and the shedding of eye-lashes is checked, and the constant succession of minute styes arrested.

LISTERINE is largely resorted to in the treatment of diseases of both the middle and external ear, according to **OTORRHœA.** the varied views of the operators. Many precede the "dry treatment" by the gentle cleansing of the parts with LISTERINE, slightly warm, or LISTERINE and tepid water, equal parts. As inflammations of the middle ear are generally the result of an extension of inflammation from the naso-pharynx, treatment of these surfaces should be instituted from the onset of the attack. The nose and throat should be thoroughly cleansed with an alkaline solution, such as:

Rx	Listerine,	.	.	.	f. 5<i>i</i>
	Glycerin,	.	.	.	f. 3<i>ii</i>
	Sodii bicarb.,	}	.	.	aa. 3<i>jss</i>
	Sodii baborat ,	}	.	.	
	Aqua q. s. ad.,				f. 3<i>lv M.</i>
<i>Sig.</i>	f 3<i>i</i>	in	3<i>ii</i>	warm water snuffed up the nose, and as a gargle for the throat three times daily.	

Literature descriptive of LISTERINE upon application.

LAMBERT PHARMACAL CO.,

ST. LOUIS, MO.

I CAN'T TAKE COD LIVER OIL!

This expression is familiar to all physicians. Perhaps nine out of every ten patients requiring Cod Liver Oil tell the same story. The thought of fishy, greasy, nauseating emulsions make them shudder. Still, Cod Liver Oil must be taken in some shape; there is no substitute for it. But there is ONE form that is better than others; ONE that contains ALL the active constituents of Cod Liver Oil---TAKEN FROM THE OIL---that form is

HAGEE'S CORDIAL COD LIVER OIL COMP.

It is better than refined Cod Liver Oil—BETTER THAN EMULSIONS—because it finds favor in the most fastidious stomach. It assimilates readily, and is certain of immediate absorption. "CHILDREN LIKE IT." All physicians endorse it after a fair trial.

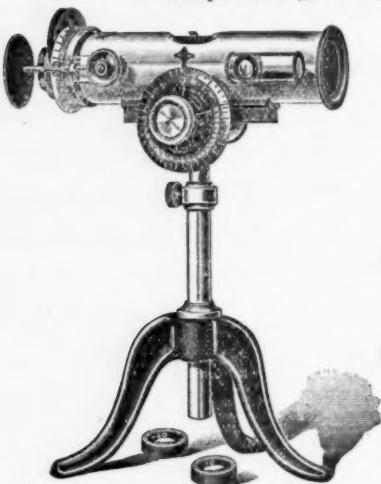
Each fluid ounce represents 33 per cent. pure Norwegian Cod Liver Oil with 6 grains hypophosphite of lime and 3 grains hypophosphite of soda.

All druggists keep Hagee's Cordial.

Katharmon Chemical Co.,
ST. LOUIS, MO.

A NEW PRICE. Latest 1898 Improved Model \$80.

Subject to 6% off for Cash in Ten days.



Guaranteed Accurate.



**ACKNOWLEDGED THE
BEST INSTRUMENT
FOR DOING REFRACTION.**

We have secured the entire output of the factory.



Write for descriptive literature.

For sale by Optical Jobbers.

JULIUS KING OPTICAL CO.
New York, 2 Maiden Lane.

Chicago, 126 State St.



**WHEN
YOU
WRITE
A PRESCRIPTION**

For pill formulæ, you naturally expect that the Pill ingredients will have the same medicinal value as though they were administered in powder form.

This will be insured beyond all question of doubt if you are particular to specify *Upjohn's* on such prescriptions. And then, too, it is a satisfaction to know that your prescriptions will be filled promptly, as *Upjohn's Friable Pills and Granules* are carried in stock by every first-class Pharmacist.

Prices on special formulæ work a matter of correspondence.

THE UPJOHN PILL AND GRANULE CO.
92 Fulton St. New York.

Kalamazoo, Mich.

APPENDIX.

xi

ELECTRICITY
IN
THE DIAGNOSIS AND TREATMENT
OF DISEASES OF THE
NOSE, THROAT AND EAR

BY
W. SCHEPPEGRELL, A. M., M. D.

Ex-Vice-President American Laryng., Rhin. and Otol. Soc.; Vice-President Western Ophthalmologic and Oto-Laryngologic Ass'n.; Late Asst. Surgeon to the Eye, Ear, Nose and Throat Hospital, New Orleans; Vice-President New Orleans Electric Soc.; Co-Editor "Annals of Otol., Rhin. and Laryng.;" Associate Editor "The Laryngoscope"; Colaborator "The Revue Internationale de Rhin., Otol. et Laryng.;" Fellow The American Academy of Medicine, Etc.

NEW ORLEANS, LA.

With 161 Illustrations, 8°, 412 Pages.

OPINIONS OF THE MEDICAL PRESS.

PHILADELPHIA MEDICAL NEWS—"This is the most complete and full presentation of the entire subject of Electro-Therapeutics in Rhinology, Laryngology and Otology by an author of acknowledged standing whose rich personal experience is here supplemented by a thorough review of the literature."

NEW YORK MEDICAL JOURNAL—"The author has long been known as a conservative but industrious worker in this therapeutic field, and many of the devices figured in the work are of his own origination. We congratulate Dr. Scheppegrell on the result of his labors. His book is a credit to American medical literature."

MEMPHIS MEDICAL MONTHLY—"In the study of the application of electricity in diagnosis and treatment of diseases of the nose, throat and ear, Dr. Scheppegrell has been perhaps the foremost investigator in this country. In his large experience he has been enabled to personally try and value each method advocated in a discriminating balance."

JOURNAL OF ELECTRO-THERAPEUTICS—"The work is, we believe, the first one devoted entirely to the electro-therapeutics of throat diseases. So complete are the descriptions in all details that any general practitioner will have no difficulty in comprehending the principals therein laid down."

THE LARYNGOSCOPE—"In the present era of oto-laryngologic progress, Dr. Scheppegrell's comprehensive work on electricity in its application in diseases of the nose, throat and ear will be recognized as an important and valuable contribution to medical literature. The volume may be justly considered as a masterpiece of its class, and the author richly deserves the praise and thanks of the profession."

JOURNAL OF EYE, EAR AND THROAT DISEASES—"Dr. Scheppegrell has presented specialdom with a valuable book; unique, in that it is the only comprehensive and systematic work upon electricity as applied to the diagnosis and therapy of diseases of the ear and upper air passages; valuable, in that it contains instruction and information that are indispensable to the well educated specialist. The book is well printed, neatly bound, and is a credit to the author and publisher."

MEMPHIS LANCET—"Possibly the best chapters, if there can be the best among so much that is excellent, are those that deal with vibratory massages and cupric cataphoresis. The latter in laryngeal tuberculosis owes much, if not all its prominence, to the author of this book. The whole work is up to date and thorough—characteristic of its energetic author."

MEDICAL RECORD—"The work is to be commended from all points of view, for it is written in a fair and impartial spirit, and frankly acknowledges the failure of electricity in certain respects, while extolling its value in others. Valuable features of the work are the elaborate bibliographical list, containing nearly 600 references, and the excellent index."

AMERICAN PRACTITIONER AND NEWS—"The profession of New Orleans is to be congratulated on furnishing so able and exhaustive a work."

G. P. PUTNAM'S SONS, 27 & 29 WEST 23D ST., NEW YORK.



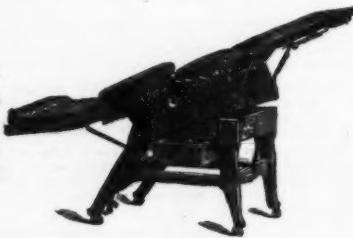
able leg rests for rectal and gynecological work. It will pay you to investigate it.

THE ALLISON . . . PHYSICIANS' TABLE.

Modern and up-to-date. Most convenient and practical Table ever invented for general practice. Adopted and recommended by the leading Medical Colleges and Post-Graduate Schools of this country. Heartily endorsed by thousands of eminent physicians in all parts of the world. Can be instantly adjusted to any desired position without inconvenience to operator or patient. Has all the chair positions. Has revolving cabinets underneath, with glass shelves for instruments, and glass trays for antiseptic solutions. Has drawers for bandages; adjust-

THE ALLISON CHAIR.

No chair has ever been offered the profession, that has given more general satisfaction. Its stability and easy manipulation have made it a favorite.



Instrument and Medicine Cabinets.

We make the most complete line of Cabinets to be found. They have every convenience desired and are eminently adapted to the purposes for which they are intended, and have come to be one of the necessities of the physician's office. Catalogue and full information free.



**W. D. Allison Co., 133-135 E. South St.
Indianapolis, Ind.**



THE MOST MODERN AND COMPLETE ENGRAVING ESTABLISHMENT IN AMERICA.

Reproductions in Black and White as well as in Colors.

FOR THE LETTER PRESS.

SPECIAL COLOR DEPARTMENT FOR REPRODUCTION OF MEDICAL SUBJECTS FOR REPORTS AND JOURNALS.

General offices, Fisher Bld'g
Plant and Works 195-207 S. Canal St. } CHICAGO.

RHINOLITH OR NASAL CALCUS—REPORT OF A
CASE AND EXHIBITION OF PATHO-
LOGICAL SPECIMEN.*

WILLIAM H. POOLE, M. D.,

DETROIT.

MEMBER OF THE AMERICAN MEDICAL ASSOCIATION, WAYNE COUNTY
MEDICAL SOCIETY, ETC.

MR. PRESIDENT AND MEMBERS OF THE WAYNE COUNTY MEDICAL SOCIETY: The pathological specimen I have the pleasure of exhibiting to you this evening is one of unusual interest, even to those of us who limit our practice to diseases of the eye, ear, nose, and throat, from the infrequency with which we meet these cases, and also from the circumstances which led up to its discovery, owing to the fact that it was situated somewhat differently from most cases of this kind.

Miss L. K., aged twenty-four years, from whose nose this was taken, consulted me January 1, 1898, regarding her nasal catarrh, with which she stated she had been afflicted ever since her childhood. Ten years ago she had been treated for about a year by one of the leading rhinologists of this city, receiving considerable benefit, but for the last two or three years she had a rather profuse nasal discharge, thickened, and increasingly offensive in character, with obstruction to nasal respiration, loss of smell, nasal voice, and the other usual symptoms which we find in an aggravated case of chronic rhinitis. Lately she had suffered from headache, which was increasing in severity, and was also troubled with weeping of the left eye. She had been using an atomizer for some years without getting any other relief than the keeping of the nose approximately clean.

On making anterior and posterior rhinoscopic examination I found considerable hypertrophy of the turbinates of the left side, especially of the inferior turbinal.

I suggested an operation for the removal of the hypertrophied tissue of the lower turbinal, which was impinging on the floor of the nose. This was agreed upon, and on Saturday, January 15th, I operated at 3 p. m. in the usual way, cocaineizing the parts thoroughly and making a practically painless operation.

Hemorrhage was not very profuse and was readily controlled at this time. The patient returned home, and soon after suffered from an attack of nervous sick headache, to which she was subject upon occasions of nervous strain.

As usual, the headache ended with an attack of retching, after which straining the hemorrhage started in afresh and rather profusely. I tried again to control it with styptics and plugging the nares with absorbent cotton, but did not succeed in thoroughly arresting the flow of blood, and, as the patient was getting very weak, with the kind assistance of Dr. Sutie, I tamponed through the posterior nares with a sponge tent, which instantly stopped the hemorrhage. I then ordered her to be liberally supplied with beef extract, for the double purpose of nourishment and to increase the arterial tension.

*Read before the Wayne County Medical Society, February, 17, 1898.

Sunday, the next day, she was doing nicely, but was very weak; there was no recurrence of the hemorrhage, but I did not think it advisable to remove the tampon as she was too weak to bear it.

Monday, January 17th, the patient was a little stronger, but owing to debility I could only remove a part of the tampon from the anterior nares.

The next two days I removed still more of the sponge anteriorly, in all about two thirds of it being removed up to this time, the patient still being too weak to bear much manipulation.

On Thursday morning, January 20th, I attempted to remove the remainder posteriorly, but found it so firmly fixed that it could not be dislodged except with extreme force under anesthesia. I called in Dr. Chittick and anesthetized the patient, when, with considerable difficulty, we removed the remainder of the sponge.

After the patient recovered from the anesthetic I cleansed the nasal cavity thoroughly with hydrozone, one part to twelve parts of lukewarm water, and she returned home rejoicing, the turbinal wound being in good condition, healing nicely.

Next morning she came to my office for treatment and stated she had enjoyed perfect freedom in breathing through that nostril until about four o'clock in the morning, when changing her position in bed, that side became suddenly obstructed. After cleansing the nostril, which was seemingly full of an offensive discharge, I discovered this body, which was attached to the posterior end on the outer side of the inferior meatus, lying, as it were, in a groove or pocket.

The anterior or loose end of it was sharp like a speculum of bone, and black in color; it was freely movable about its long axis, so that you could pass a cotton holder around it and lift it from its bed. After cocaineizing, I grasped it with a dressing forceps and, giving it a twist, removed it. I then thoroughly cleansed and disinfected the cavity with the hydrozone solution, which removed the odor and rendered the cavity wholesome.

The next day the two smaller pieces were removed while cleansing and treating the nose. They were loose and seemed as though they had just sealed off from the bed where the larger piece had lain.

The spraying of the nasal cavity with hydrozone, followed by the use of glycozone, constituted the treatment for the next four days, by which time the offensive odor had entirely disappeared, and the parts had assumed a healthy condition.

This concretion formed on the outer side of the inferior meatus, and as it grew larger it obstructed the flow of tears through the naso-lacrimal canal, as evidenced by the overflow of tears from the left eye, which condition ceased immediately after removal of the rhinolith.

The secondary hemorrhage was evidently due to a relaxation of the pressure on the vessels of the turbinale, owing to the calculus being disturbed in its position when the patient was retching.

As to the exciting cause of the formation in the case of this young lady, I could get only a negative history, there being no recollection of any foreign object having been put up the nose in her childhood. Being desirous of ascertaining, if possible, what served as a nucleus, and at the same time of finding out the composition of the formation, I cut it in two.

Microscopical examination reveals that it is composed of amorphous phosphates, undoubtedly the phosphates of calcium and sodium, which came from the tears.

There has been a marked improvement in the young lady's condition since the removal of the rhinolith; overflowing of the tears in the left eye has ceased, nasal respiration has become perfect, her voice has lost the nasal twang, and her general health has improved rapidly, as indicated by the fact that she has gained four pounds in weight since the operation (four weeks ago), and is still improving.—*New York Medical Journal*.

XEROFORM

(TRIBROMPHENOL-BISMUTH.)

A yellowish-green, neutral, insoluble, non-tonic, non-irritating, and non-caustic, impalpable powder, containing 50 per cent. of bismuth oxide in chemical combination with 50 per cent. of tribromphenol, almost devoid of odor and taste, and non-irritant to the mucose and organs of digestion. It is the ideal substitute for iodiform, being an antiseptic, antibacterial, desiccating, and deodorizing agent, free from germs, and capable of being sterilized by simple heating to 120° C. (248° F.). Xeroform is sedative, analgesic and haemostatic, and promotes cicatrization more actively than any other agent. It is eminently secretion-lessening, and diminishes suppuration with remarkable rapidity. It does not irritate the wound or the neighboring tissues, nor does it cause eczema. It causes fresh wounds to heal by first intention; and old ulcerations close up quickly under its use.

Taken internally it is split up in the intestinal canal into tribromphenol and bismuth oxide, and forms insoluble combinations with the ptomaines and toxines that may be present there. From the clinical results obtained it is demonstrated to be one of the best intestinal anticeptics in diarrhoea, dysentery, Asiatic cholera, typhoid fever, intestinal tuberculosis, diabetes and uremia.

Lewis S. Somers, M. D., of Philadelphia (N. Y. Med. Jour., Dec. 24, 1898), says: "The method of treating suppuration of the tympanic cavity with solutions and the syringe is most harmful; the two latter methods offer a basis for the successful use of drugs in the majority of cases. When powders are used much depends upon their mode of application and the size of the perforation in the membrana tympani. When the perforation is small, and especially when it is situated high up, powders should not be used; but when the membrana tympani is absent, or when the perforation is large and the discharge is moderate in amount, the judicious use of an antiseptic such as the one under consideration will be productive of much good. Drainage is indicated in practically the same conditions, and also when the perforation is smaller and the discharge offensive and profuse."

The method of treating these cases is as follows: The external canal and middle ear are thoroughly cleansed with peroxide of hydrogen applied on a cotton-tipped applicator, all granulation tissue having previously been removed; then the powder is lightly dusted over the secreting surfaces and a gauze drain inserted, reaching from the tympanic margin to the concha. Over the external canal and fitting into the concha, a pad of sterile absorbent cotton is placed and allowed to remain for one or two days, as the amount of discharge may indicate. All the cases in which Tribromphenol-Bismuth was used were improved or apparently cured under the treatment outlined, after other methods and remedies had been tried."

We will supply physicians who are unable to obtain **Xeroform** from their druggists, at **60 cents per ounce vial**, including packing, postage and insurance.

We also furnish **Xeroform Gauze**, 10 per cent., in sterile glass jars, hermetically sealed, containing 1 yard, at **50 cents per jar**, express charges extra.

SCHERING & GLATZ,
No. 58 Malden Lane, New York, N. Y.

AN EMULSION.

Dunglison's Medical Dictionary defines Emulsions as follows:—“Pharmaceutical preparations of a milky-white opaque appearance, composed of oil divided and held in suspension in water by means of mucilage.”

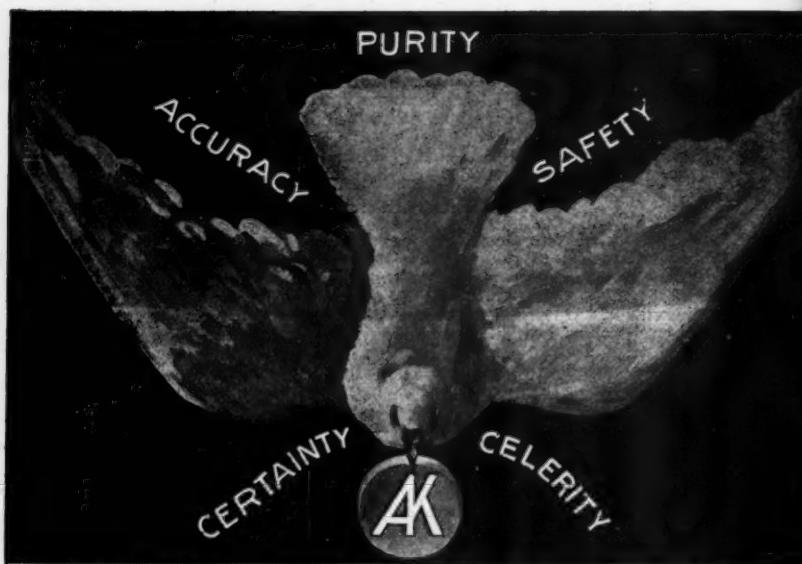
Worcester says—“A medicinal preparation of milky appearance composed of a fixed oil divided and held suspended in water by means of mucilage.”

There seems to be a very general agreement that mucilage is the essential part of oil emulsions. When the physician prescribes an emulsion of fat, he attempts to present fat to the absorbing vessels of the bowels ready for immediate absorption. Gum Arabic and Gum Tragacanth (the one generally used, and which is insoluble in water), are not foods. But when emulsions are prescribed, you are compelled to give not less than fifty per cent. of these substances, which are known to be inert, and which increases the difficulty of absorption. In an emulsion each oil globule receives an envelope or coating of gum, consequently the digestive fluids are not only compelled to break up the globules anew, but are first compelled, in order to reach the oil, to dissolve the envelope of gum.

Hagee's Cordial Cod-Liver Oil Comp. is not an emulsion, but an elegantly aromatized *cordial* containing *all* the active principles of Cod-liver Oil taken from Cod-liver Oil, without the grease.

WHEN PAIN IS DOMINANT.

“A number of years ago, in conversation with my old friend, Professor Stucky, of Louisville, he told me that he used far less morphine now than formerly and that he was able to combat the factor of pain as successfully in the majority of cases without it as he did with it. He urged me to give antikamnia to my patients who had neuralgia, la grippe, rheumatism, locomotor ataxia and dysmenorrhea, instead of using morphine. I acted on his suggestion and have been able to relieve this class of patients as effectively and without producing the evils that result from the exhibition of opium or its alkaloids. Antikamnia possesses anodyne, antipyretic and analgesic virtues and has been thoroughly tried by able therapeutists. Prof. Shoemaker, of Philadelphia, has found it very valuable in rheumatism, migraine or neuralgic headache and many other nervous affections.”



"That Gentler on the Spirit Lies,
Than Tir'd Eyelids on Tir'd Eyes"

SAMPLES ON APPLICATION TO THE ANTIKAMNIA CHEMICAL CO., ST. LOUIS, U. S. A.

A.

P

in t
urh
starg
ole,

in i
yph

n

To
od a

F

ol. E



HAMBERS, INSKEEP & CO.

MANUFACTURING OPTICIANS,
146 STATE ST., CHICAGO.

OCULISTS PRESCRIPTIONS A SPECIALTY.

TRIAL CASES AND OPHTHALMOSCOPES AT LOWEST PRICES.

WE GUARANTEE OUR WORK THE BEST PROCURABLE.

SEND FOR CATALOGUE.

CHAMBERS, INSKEEP & CO.,

146 STATE ST., CHICAGO.

Protargol in ocular therapeutics.

"A specific in Gonorrhœal Ophthalmia." (Dr. Darier, Paris.)

In the treatment of affections of the eyes, especially the various forms of conjunctivitis, malar, purulent, blenorragic, trachoma, dacrocystitis, and as an antiseptic in operations, Protargol has proved unirritating, safe and efficient. It is a proteid silver compound, readily soluble, of neutral reaction, undecomposed by secretions, and strongly bactericidal.

EUROPHEN.

An Iodoform substitute of especial value in syphilitic affections of the eyes, ear and nose.

ARISTOL.

An antiseptic, cicatrizing, and alterative in all diseases of the eyes, ear and nose.

Trional, hypnotic and sedative.

To quiet restlessness and secure sleep after operations upon the eyes Trional has been found an ideal remedy, producing normal refreshing sleep, without unpleasant sequelæ.

Send for samples and literature to

FARBENFABRIKEN OF ELBERFELD CO., 40 Stone Street, New York.

Selling Agents for the Bayer Pharmaceutical Products:

Bayer, Europhen, Ferro-Somatose, Hemicranin, Iodothyrine, Lacto-Somatose, Losophan, Lycetol, Phenacetin, Pipera-zine-Bayer, Protargol, Salicylic Acid, Salophen, Somatene, Sulfonyl, Tannigen, Tannopine, Trional.



HYDROZONE

(30 volumes preserved aqueous solution of H₂O₃)

IS THE MOST POWERFUL ANTISEPTIC AND PUS DESTROYER.
HARMLESS STIMULANT TO HEALTHY GRANULATIONS.

GLYCOZONE

(C. P. Glycerine combined with Ozone)

IS THE MOST POWERFUL HEALING
AGENT KNOWN.

These Remedies cure all Diseases caused by Germs.
Successfully used in the treatment of Chronic and Acute Ulcers
(Specific or not),

**Skin Diseases, Eczema, Psoriasis, Salt Rheum,
Itch, Barber's Itch, Poisoning Ivy, Acne, Etc.**

Hydrozone, applied to any open diseased surface, destroys the pus leaving the tissues beneath in a healthy condition. Then Glycozone, being applied to the clean surface, stimulates healthy granulations and heals the sore.

Inflammatory and Purulent Diseases of the Ear. Otitis Media, Etc.

By means of a glass syringe, inject Hydrozone, either full strength or diluted, and complete the dressing with a small roll of cotton well impregnated with Glycozone.

Send for free 240-page book "Treatment of Diseases caused by Germs," containing reprints of 120 scientific articles by leading contributors to medical literature.

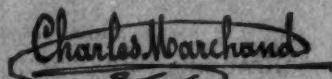
Physicians remitting 50 cents will receive one complimentary sample of each "Hydrozone" and Glycozone" by express, charges prepaid.

Hydrozone is put up only in extra small, small, medium, and large size bottles, bearing a red label, white letters, gold and blue border with my signature.

Glycozone is put up only in 4-oz., 8-oz. and 16-oz. bottles, bearing a yellow label, white and black letters, red and blue border with my signature.

Mar-hand's Eye Balsam cures all inflammatory and contagious diseases of the eyes.

PREPARED ONLY BY


Charles Mar-hand

Chemist and Graduate of the "Ecole Centrale des Arts et Manufactures de Paris" (France).

Charles Mar-hand, 28 Prince St., New York.

Sold by leading Druggists. Avoid Imitations.  Mention this Publication.

G
rs
1,
ous
ng
re.
or
ed
s,"
ole